

*May* 1943

# TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office





# technology review

Published by MIT

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# *The CORRECT wheel will lick the GRINDLINS*



With each development the Grindlins go into action.

The Norton idea of providing special structures of Grinding Wheels for specific types of work cannot be "whispered" down.

Yes, the Norton No. 12—extreme open structure may double or even treble your grinding machine production—IF THE JOB CALLS FOR THIS KIND OF WHEEL.

But a No. 8- or 5- or 3-structure wheel may look more like the "wonder wheel" IF you have been using the **WRONG** grain, grade or structure combination on the job.

When you hear sounds like the whisperings of the phantom Grindlins, it's time to tune your ear to catch the voice of engineering experience.

**NORTON COMPANY • Worcester, Massachusetts**  
Behr-Manning Division—Troy, N. Y.

**NORTON ABRASIVES**





**Every Eye Accident  
PREVENTED**

**Saves Man-Power for War-Power**

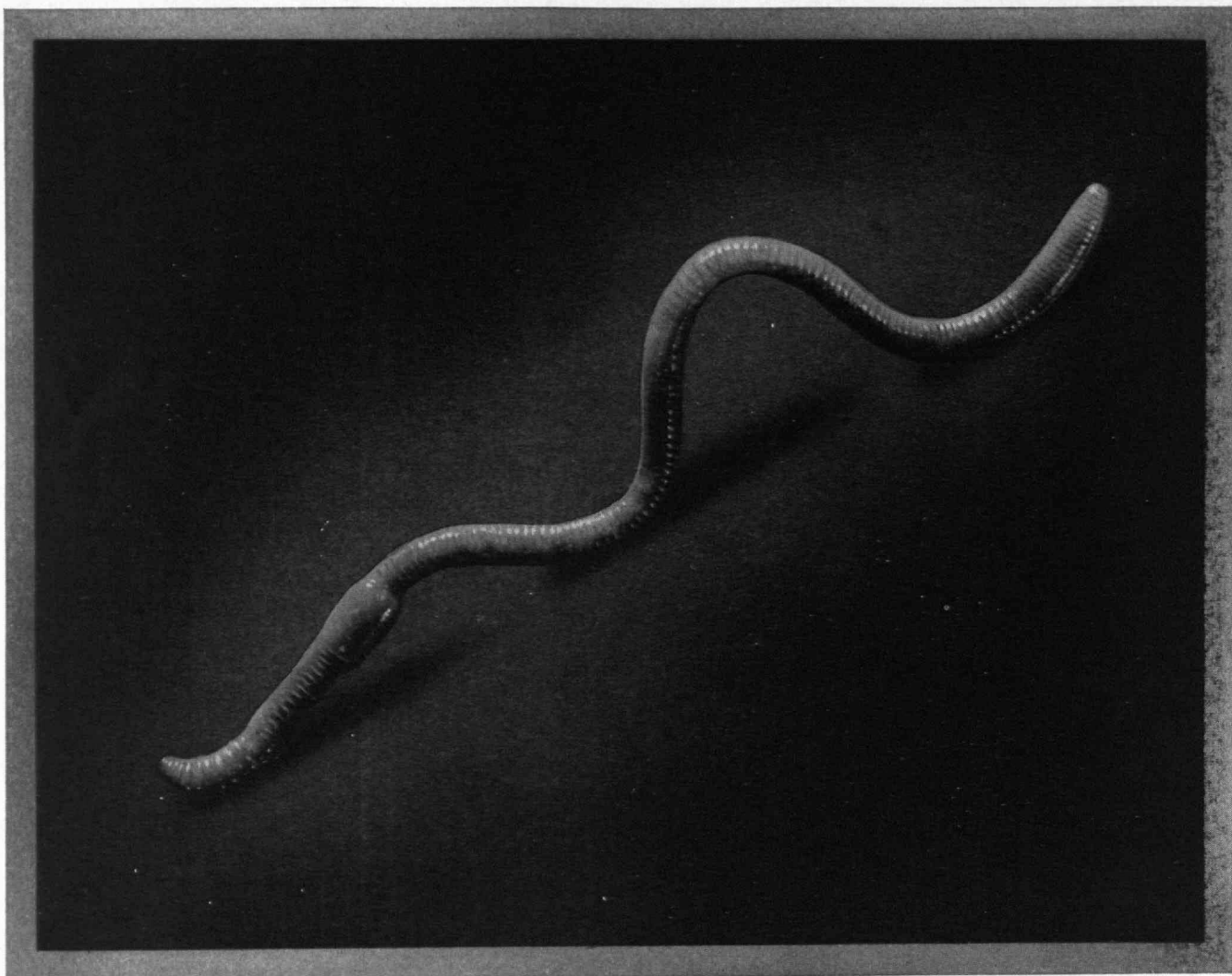
*Install a Complete AO Eye Protection  
Program in Your Plant*

The sooner our fighting forces get ALL the weapons and equipment they need, *the sooner the final big offensive will begin*. Make sure that no eye accidents occur in *your* plant to take irreplaceable workers from their jobs, to keep tools of war from our boys at the front.

American Optical Company, pioneer manufacturer of eye protection equipment, is prepared to give you the benefit of long and varied experience in promoting eye safety. AO offers a complete line of comfortable protective goggles—a design for every type of eye hazard . . . free posters, helpful literature, and the services of a highly trained AO Safety Representative—to cooperate with your Safety Director. Get in touch with your nearest American Optical branch office today.

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COMPANY  
SOUTHBRIDGE, MASSACHUSETTS





## *Unlike an angleworm* **TYGON** IS STILL FLEXIBLE AT 80° BELOW!

**RUBBER** and angleworms have this in common: at room temperatures both possess flexibility — at 80° below neither can wiggle a molecule!

Unlike an angleworm, unlike rubber, certain Tygon formulations retain their flexibility at temperatures even lower than 80° below. In fact, one Tygon formulation can be readily bent in an 180° arc at 105° below zero!

This startling characteristic of Tygon is but one of many amazing properties of this versatile rubber-like synthetic.

Tygon was originally developed as a corrosion-resistant material for the process industries, and has been used for several years as a protective lining for tanks and equipment in which corrosives are made and handled. Tygon's ability to withstand the oxidizing elements that attack rubber, its resistance to most of the corrosive agents which attack metals, plus its remarkable flexi-

bility in application, has extended its usefulness to all industry seeking a material with the physical properties of rubber but without rubber's characteristic weaknesses.

Tygon molded and extruded items, for example, possess remarkable resistance to corrosion, show no tendency to swell in the presence of oil or water, have an abrasion resistance in excess of rubber, and a dielectric strength in many cases over 1000 volts per mil. Tygon molding formulations are non-corrosive to metal, and may be molded to extremely close tolerances. Tygon flexible tubing, in tests on high speed vibrating automatic machines, has consistently shown a flex life ten to twelve times that of rubber. Tygon is non-toxic which permits its use on food and beverage equipment.

In addition to molding and extruding formulations, Tygon is made in rigid or

flexible sheets for use as protective linings or for gasketing; and in liquid form for use as a corrosion-resistant paint, or for impregnation of fabrics.

If your design problems call for the use of rubber-like materials where such factors as strength, durability, low temperature flexibility, resistance to corrosion and abrasion, are important — it will pay you to investigate Tygon. Write today, without obligation, for Bulletin 1621-A. Address your requests to: Engineering Department, U. S. Stoneware Company, Akron, Ohio. In Canada, to: Chamberlain Engineering, Ltd., Montreal.



**U. S. STONWARE**

AKRON, OHIO

ENGINEERS • MANUFACTURERS • ERECTORS • *of* CORROSION-RESISTANT EQUIPMENT



## Wartime readjustments . . . #8



BEFORE MOTHER GOES MARKETING, THE MCARGLES ALWAYS CALL A KITCHEN CONFERENCE TO FIGURE COUPON POINTS

AMERICANS are willingly adjusting themselves to wartime rationing, but every one will be happier when the need is over.

The burden is heaviest on Mother. She's getting a taste of the severe budgeting that could become permanent, if she were left with inadequate life insurance.

No man wants to ration his family for life—for lack of life insurance. With taxes and War Bonds, money for life insurance may be hard to save—but the effort is doubly worth while in wartime!

For life insurance premium dollars are fighting dollars. Through investment in basic war industries—and in Government Bonds—premium dollars

support the war program, combat inflation, and provide protection for American families.

Talk things over today with a New England Mutual representative . . . so your family won't be rationed in the post-war world!

### New England Mutual contracts meet present-day needs because:

- 1 **DIVIDENDS** begin at the end of the first year.
- 2 **CASH VALUES** begin at the end of the second year.
- 3 A **PREMIUM LOAN** is available beginning with the second annual premium.

## New England Mutual Life Insurance Company of Boston

George Willard Smith, President Agencies in Principal Cities Coast to Coast  
The First Mutual Life Insurance Company Chartered in America—1835

## Call another kind of conference!

A little study makes ration coupons go farther—and makes insurance dollars go farther, too.

But you don't need an adding machine, an abacus, and a family huddle to readjust your wartime insurance program. One able underwriter is enough.

A number of them are listed below. They're alumni of your college and they talk your language. They are also trained representatives of the First Mutual Life Insurance Company Chartered in America.

Out of their experience you'll get practical, constructive suggestions. They'll help you make the most of your limited life insurance dollars—help you protect your present policies with premium loans if necessary. Call an insurance conference and check your protection now when you need it most.

RAYMOND P. MILLER, '18  
Salem

ARTHUR C. KENISON, '19  
Boston

BLAYLOCK ATHERTON, '24  
Nashua

If none of these folks is near you, you can get similar service at the New England Mutual office in your city. Or use the coupon below, and the Home Office will be glad to have a competent representative confer with you. There is no obligation, of course.

NEW ENGLAND MUTUAL LIFE  
INSURANCE COMPANY OF BOSTON  
Box 1-3, 501 Boylston St., Boston, Mass.

Please have one of your representatives get in touch with me, without obligation on my part.

Name \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_



# Bus to Berlin

EVERY TIME I take the bus in the morning I think, "I'm going home!"

Going home—*by way of Berlin.*

Not for the fun of it, but because that is the way we all must go.

Tom's on *his* way, too—he's going by way of Iceland, and Ireland, and Casablanca.

And I'm on *my* way, too—by way of Elm Avenue, and Main Street, and the Boulevard, to Gate 10 every morning.

For my job in a war plant, and Tom's job in the war itself, are just different parts of the same journey.

It's the *long way* to go, but it's the *only way*.

For home, you know, isn't just a place and a roof.

It's love, and security, and freedom from fear and want and drudgery, and freedom itself!

So I don't count the miles any more, I just count the stops—on the way to Berlin and Tokio.

Because the roads to Berlin all lead home again!     ✓     ✓     ✓

NOT ALL of our progress on the road that leads to Berlin and Tokio, and back home again, can be measured in terms of miles

or military objectives—though these are the payoff.

The performance of a single worker in a war industry, or the discovery of a single scientist, is real progress.

Or the production of a single company. General Electric produced a billion dollars' worth of war products in 1942!

Or new problems solved—research in electronics, metallurgy, plastics, television, or incandescent and fluorescent lighting.

For these are things which will shorten the miles, and lengthen the distance between stops, for the boys who are going to Berlin and back.

And they lead to job, and home, and freedom, and opportunity, in a better world tomorrow. General Electric Company, Schenectady, N. Y.

*The volume of General Electric war production is so high and the degree of secrecy required is so great that we can tell you little about it now. When it can be told completely we believe that the story of industry's developments during the war years will make one of the most fascinating chapters in the history of human progress.*

**GENERAL  ELECTRIC**

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## THE ONLY REAL HERMETICALLY-SEALED RESISTORS

*...that will stand the most severe salt water  
immersion and temperature shock tests*

STYLE "B"  
90 WATTS

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50 WATTS

STYLE "A"  
120 WATTS

STYLE "D"  
35 WATTS

STYLE "MFA"  
PRECISION  
7.5 MEGS. MAX.

STYLE "E"  
20 WATTS

STYLE "MFB"  
PRECISION  
4 MEGS. MAX.

STYLE "F"  
10 WATTS

SPRAGUE  
**KOOLOHM**

## POWER WIRE WOUND RESISTORS AND METER MULTIPLIERS

These Koolohms, designed for the toughest resistor applications facing the industry today, again emphasize the importance of exclusive Koolohm construction features combined with Koolohm engineering ingenuity in solving almost any wire wound resistor problem.

For Koolohms are entirely different from



conventional wire wounds. There are no other resistors like them. No other type of resistor can match their performance on exacting jobs. AVAILABLE WITH NON-INDUCTIVE WINDINGS. Get the facts! Write for catalog and sample Koolohms. SPRAGUE SPECIALTIES COMPANY (Resistor Division), North Adams, Mass.



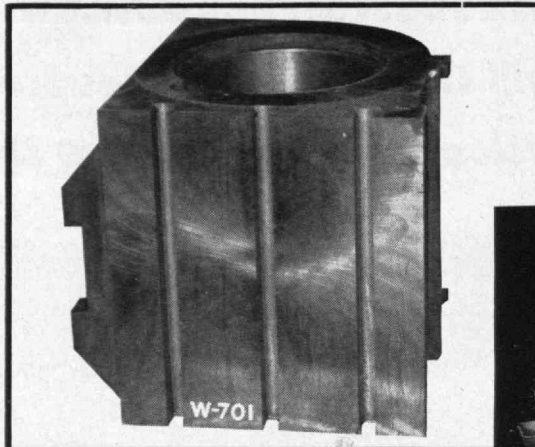
BLANCHARD

**CHECK THESE  
ADVANTAGES  
OF BLANCHARD  
GRINDING**

- ★ **Production**
- Adaptability**
- Fixture Saving**
- ★ **Operation Saving**
- ★ **Material Saving**
- Fine Finish**
- ★ **Flatness**
- ★ **Close Limits**

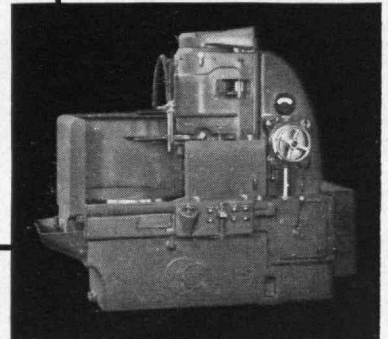
..... Especially  
valuable on jobs like  
the one illustrated.

**"PUT IT ON THE BLANCHARD"**



Semi-Steel  
Stock per side  $\frac{1}{8}$ "  
Limits  $\pm .005$ "  
square .001"  
to .0015" in 16"

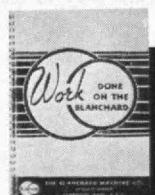
No. Sides 6  
1 piece (6  
surfaces)  
1 hour and  
35 min.

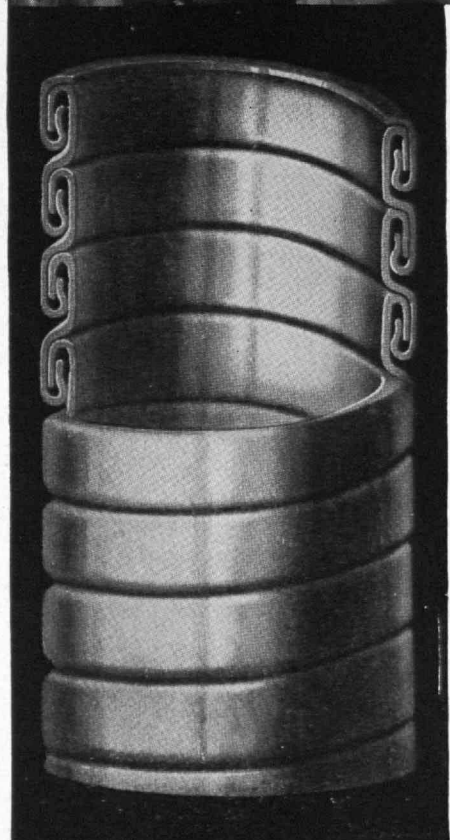
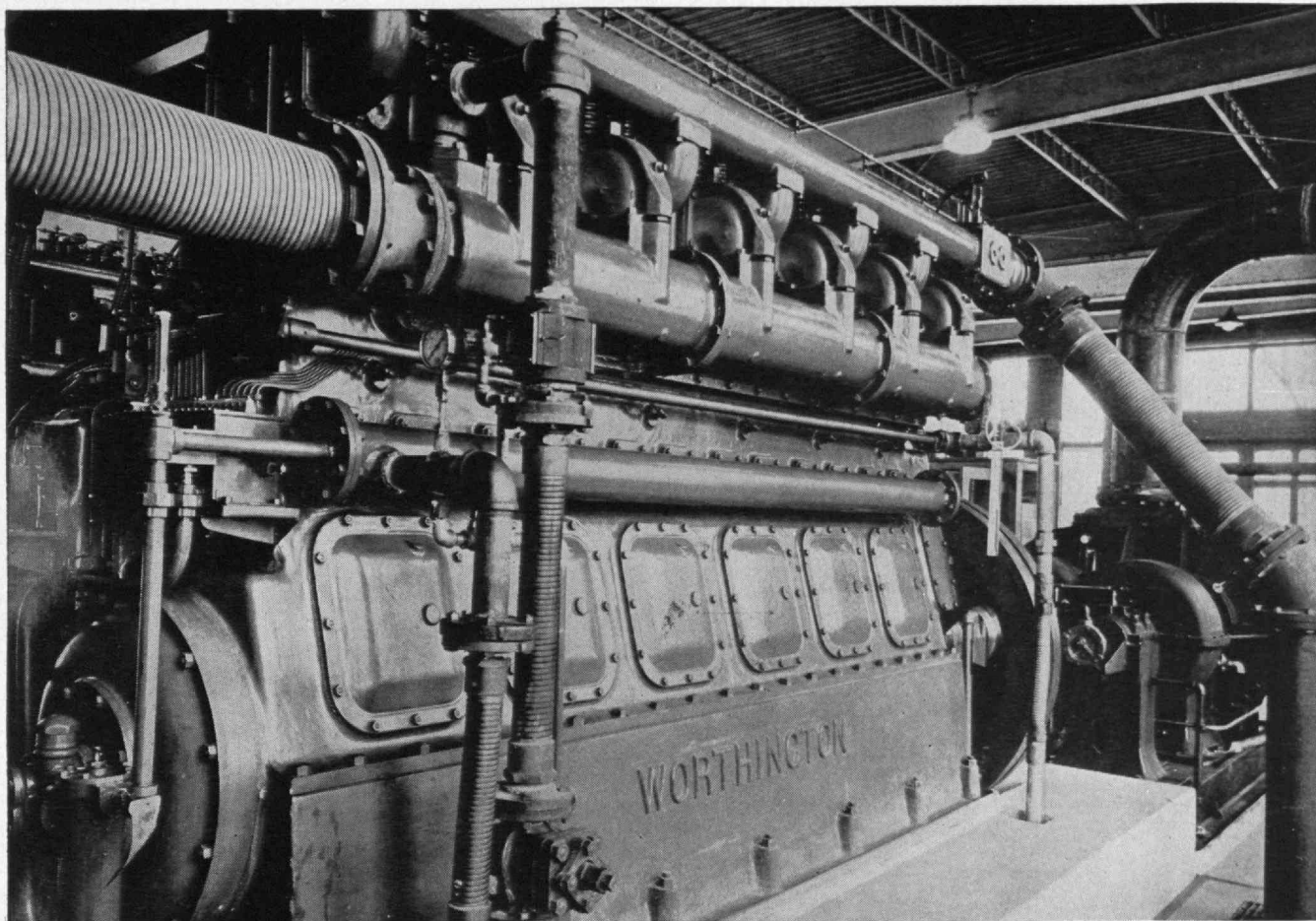


THE SHAPER TABLE,  $15\frac{1}{2}$ " x 16" x 16", illustrated here, is an excellent example of large, heavy work which may be ground with ease on a Blanchard No. 18 Surface Grinder with 6-inch extended column. These tables come to the Blanchard as rough, semi-steel castings. Six sides are ground,  $\frac{1}{8}$ " stock being taken off each side.

*The* **BLANCHARD**  
**MACHINE COMPANY**  
64 STATE STREET, CAMBRIDGE, MASS.

Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.





## **PENFLEX Metallic Hose**

**... Armored for Safety**

**... Flexible for Service**

Uninterrupted Service and Safety are important factors in generating power for War Production. PENFLEX Metallic Hose with 4-wall interlocking joint construction and  $\frac{3}{8}$ " "come and go" per lineal foot of length is designed for long life, trouble-free service on intake and exhaust lines, oil, water and other connections. It resists thermal and mechanical strains and fatigue... it absorbs vibration and provides safe, economical service.

PENFLEX WELD corrugated, jointless Tubing gives leakproof service on fuel oil feed, circulating water, and starting air lines.

Full data in practical diagrammatic form in Bulletin 71.

In sizes 1" to 18" I. D.



**PENNSYLVANIA FLEXIBLE METALLIC TUBING CO.**

7211 Powers Lane, Philadelphia, Pa.

ESTABLISHED 1902



## SPEED UP LIGHT TURNING AS WELL AS GRINDING with 9" ROTARY MODEL PERMANENT MAGNET TYPE CHUCK

Transferred easily from machine to machine or machine to bench—especially useful for pieces difficult to hold in chuck jaws. Catalog of full line on request. **No Wires—No Heating—No Operating Costs.** Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

For sale only in the U. S. A. and its Territories and Canada.



# BROWN & SHARPE

## BATH IRON WORKS CORPORATION

*Shipbuilders and  
Engineers*

BATH, MAINE

## THE TABULAR VIEW

**Sweet Music.**—Why is so little known about starch? Answers to this question, which is of much industrial importance, are suggested (page 363) by RICHARD S. BEAR, Associate Professor of Biophysical Chemistry at Technology, in an illuminating essay reporting recent advances in research. Professor Bear, a graduate of Princeton and the University of California, joined the Institute Faculty in 1941.

**Unity.**—Co-operation between science and the humanities in bettering mankind's estate was the theme of a penetrating address to chapters of Sigma Xi and Phi Beta Kappa by JAMES B. CONANT, President of Harvard University, which is basis of his essay in this issue of The Review (page 366).

**Targets.**—Replanning of cities, if it is to be effective, requires agreement on standards. To this end, FREDERICK J. ADAMS, Associate Professor of City Planning at Technology, has been studying questions of the crowding of people on land, tentative answers to which he presents on page 368.

**Protection.**—The relations between patents and industrial research are analyzed in the concluding portion of a discussion by ROBERT E. WILSON, '16, of recent attacks on the American patent system (page 371). Dr. Wilson's article is drawn from his address as Perkin medalist for 1943.

**Tides.**—HERBERT S. SWAN, industrial consultant and city planner who has frequently discussed social trends for The Review, is concerned in this issue (page 360) with the ebb and flow of workers and employment.

**Light.**—Our cover this month depicts crystals of magnesium, of interest not only because the light metal is today of such urgent utility in the war effort but also because these crystals were produced by the direct thermal reduction of dolomite in vacuum, the technique representing the first large industrial application of high vacuum.

## SHIPS, GUNS, PLANES, TANKS PLUS essential goods and services

Yes, America is meeting the challenge here and abroad on all fronts. We know that the fighting front and the home front must *both* be supplied at an ever-increasing tempo. It is with full realization of the need at hand that this firm is perfecting its facilities for handling vital war work and supplying goods and services needed at home.

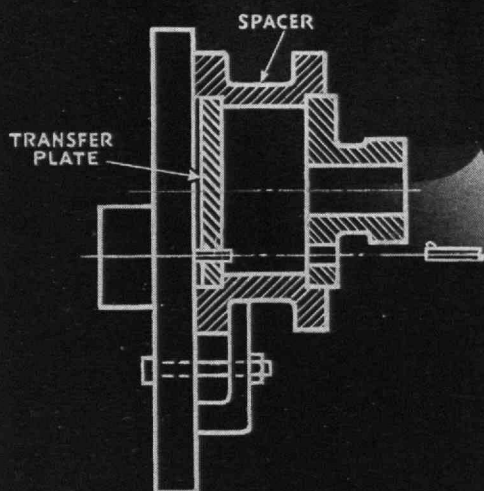
*Latitude Blue Print Paper  
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Drawing Materials*

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*Three convenient locations*

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113 Purchase St.  
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## ...transfer plate helps accurate center boring

*Information supplied by an Industrial Publication*

The problem of drilling a number of holes in a part on precise center distances is seldom simple. It is particularly complicated in mass production of parts where holes must register accurately.

The answer in one plant is what is known as a transfer plate. This is really a circular template, of any thickness over  $\frac{1}{8}$  inch, with uniform holes drilled on accurate centers. These holes fit a pin located at the exact center of a lathe face plate.

In mounting, the work is assembled to the transfer plate with a spacer between. The assembly is pinned

to the face plate through one of the holes in the transfer plate, and clamped tight.

A boring bar in the lathe tool rest can be used to bore a hole of any desired size in the work. The hole will be exactly in line with the pin, and consequently with the hole in the transfer plate.

Subsequent holes are bored by passing the pin through the remaining holes in the plate, until all are bored. When finished, every hole, regardless of diameter should be on the same center as the corresponding hole in the plate.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS. MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

**Climax Molybdenum Company**  
**500 Fifth Avenue • New York City**



# HIGH ACCURACY pH EQUIPMENT

## SINGLE and MULTI-POINT RECORDERS



Cambridge design insures accuracy and trouble-free performance to a degree hitherto unknown. The Multi-Point Recorder provides *on one chart*, simultaneous records of pH at separate sampling points in the plant. Electrodes (glass) are housed in non-clog continuous-flow type chambers and may be installed wherever wanted. Cambridge is line operated.

## CAMBRIDGE pH METERS

Laboratory and Industrial models provide continuous null indication. Sensitive to .005 pH, stable, rugged and portable. Operate from any convenient 110 volt AC. outlet.

Send for Bulletin 910-E

## CAMBRIDGE INSTRUMENT CO., INC.

3732 Grand Central Terminal • New York, N. Y.

# CAMBRIDGE PRECISION INSTRUMENTS



## Hevi Duty Electric Co.

### Electric Furnaces

MILWAUKEE, WISCONSIN

Hevi Duty Precision Electric Heat Treating Furnaces are built in a large variety of types and sizes — for many heat treating operations — with temperature ranges to 2500° F. (1371° C.). They are standard production equipment in many national industrial plants.

Write for descriptive bulletins

GEORGE A. CHUTTER, '21

District Manager

90 West Broadway

New York

ELTON E. STAPLES, '26

District Manager

205 W. Wacker Drive

Chicago, Ill.

## MAIL RETURNS

### Stop, Look, and Listen

FROM JUDSON C. DICKERMAN, '95:

In many respects the April Review is a well-balanced issue. I especially like the occasional articles that refer to the long history of man. It may help to keep down our present-day shortsighted egotism. The statements in "The Trend of Affairs" emphasizing the value of authentic anthropological studies as guides to our present and future relations with the races of mankind, possessed of diverse environments and traditional attitudes engendered thereby, are good stop, look, and listen signs.

Today we are hearing again much about marvelous inventions, new products, and so on, to be released as soon as military conditions permit. I seem to remember much the same order of prognostications during the 1914-1918 period. I'm just wondering if some competent person of your staff might not throw interesting light on this subject of how much a mass of people is apt to be affected by a horde of new devices. After all, many new things are only substitutes for other things that must be discarded. The standards of living are not advanced by the adding of the new on top of the old. There is a loss as well as a gain.

A review of the important changes which followed the great stimulation of invention, and so on, of 1914-1918 and which really affected the people as a whole, say within 10 years after that period, might help keep our feet on the ground.

Chevy Chase, Md.

### An Old Friend

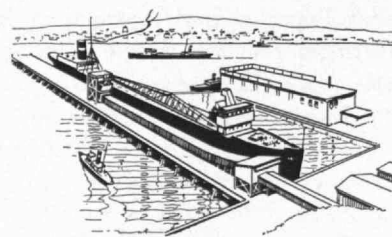
FROM CAPTAIN REGINALD A. BISSE, '30:

Reading The Review for November was like meeting an old friend until I chanced to glance through the list of my classmates serving with the armed forces of the United States and found that I'd been overlooked entirely. Tsk and tsk! Despite my natural inconspicuousness and wholly undistinguished service, I'm sure my son and daughter wouldn't like to see their daddy's name omitted that way. . . . So, "Correction, please?"

I could give you an earful about what some of the aforehereinmentioned classmates are doing, but nobody knows whose curious ears (or eyes) would get in the way first. Hence discretion and appreciation of the need for and value of such things as censorship preclude any lengthy statement on that subject. Suffice it to say that the Institute can and should be mighty proud of most of 'em. . . .

A.P.O. 682, Care of Postmaster, New York, N. Y.

### Speed with Economy



Old Colony Coal Terminal

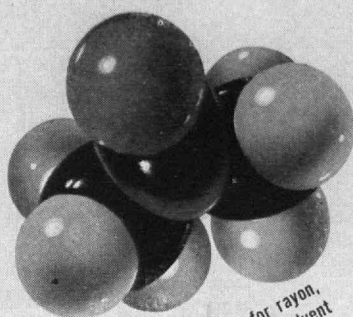
In our 25 years of industrial building, we have erected factories, warehouses, power plants, coal handling terminals, bulkheads, special tanks, etc. This wide range of experience may prove valuable to you.

## W. J. BARNEY CORPORATION

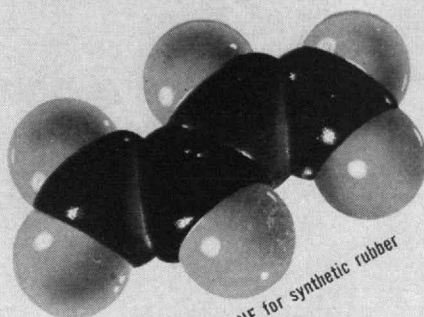
101 PARK AVENUE, NEW YORK

### INDUSTRIAL CONSTRUCTION

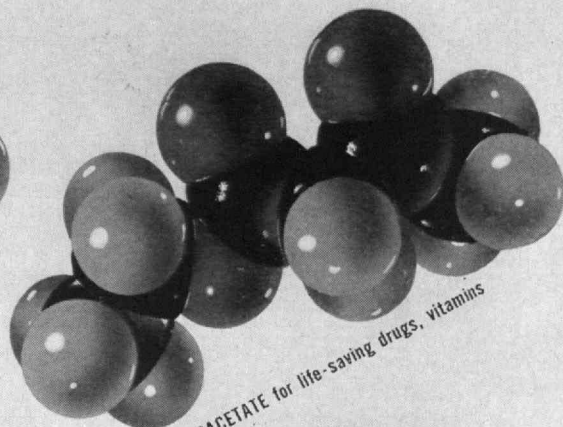
Alfred T. Glasett, '20, Vice President



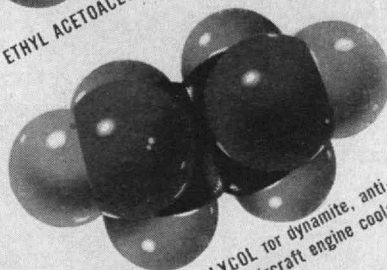
ACETONE for rayon,  
photo film; solvent



BUTADIENE for synthetic rubber

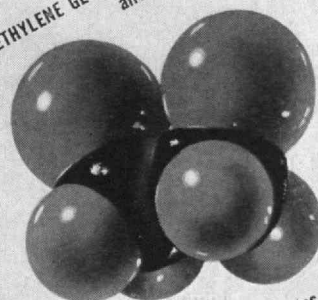
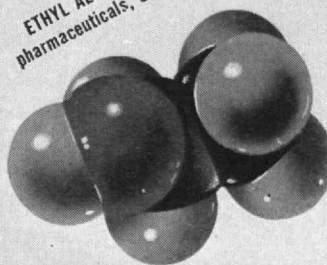


ETHYL ACETOACETATE for life-saving drugs, vitamins



ETHYLENE GLYCOL for dynamite, anti-freeze,  
aircraft engine coolant

ETHYL ALCOHOL for lacquers,  
pharmaceuticals, smokeless powder



ETHYLENE DICHLORIDE for vitamins,  
anti-knock fluid, plastics, insecticides

## Molecular Keys To A New World

VAST NEW SOURCES of raw materials . . . the equivalent of those which might be found in a great new continent . . . opened to America when CARBIDE AND CARBON CHEMICALS CORPORATION, a Unit of UCC, started building synthetic chemicals from water, salt, air, and hydrocarbons.

These chemicals are usually water-white liquids, although some are gases or solids. Basically, they are compounds of carbon and hydrogen—united with oxygen or with chlorine to build up an endless series of chemicals. The models of those molecules of chemicals shown here are many millions of times actual size.

These chemicals are the raw materials for fabulous plastics . . . amazing textile fibers . . . life-saving drugs . . . vitamins by the carload . . . synthetic rubber . . . more things and better things than were possible before their existence.

Since these chemical wonders are obtained from abundant domestic sources, their use has contributed materially to the nation's self-sufficiency. Through research, American ingenuity, and patient development, scarce natural products have been duplicated or improved upon. Great new industries and great new materials that contribute to the nation's strength have come into being. And America has become a leader in a field as native as its own soil.

Broadly speaking, the uses of many of the synthetic organic chemicals developed by CARBIDE AND CARBON CHEMICALS CORPORATION are just beginning. The already established uses are indicative of their vast future values to mankind.

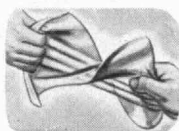
**BUY UNITED STATES WAR BONDS AND STAMPS**



**BETTER MEDICINES!** Amazing medicines like the sulfa drugs, synthetic vitamins, powerful insect repellents, and anti-malarial drugs depend upon synthetic organic chemistry.



**COLD PROOF!** Coolant for liquid-cooled aircraft engines and base for anti-freeze in military cars and trucks is ethylene glycol, an important synthetic chemical.



**MAGIC PLASTICS!** Wonderful plastics that look like glass, stretch like rubber, and which are proof against water, sunlight, oils, and many chemicals are made from VINYLITE synthetic resins.



**MAN-MADE!** All types of synthetic rubber require synthetic organic chemicals for their manufacture. Here's hope for tires for you in the future.

## UNION CARBIDE AND CARBON CORPORATION

30 East 42nd Street **UCC** New York, N. Y.

*Principal Products and Units in the United States*

### ALLOYS AND METALS

Electro Metallurgical Company  
Haynes Stellite Company  
United States Vanadium Corporation

### CHEMICALS

Carbide and Carbon Chemicals Corporation  
**ELECTRODES, CARBONS AND BATTERIES**  
National Carbon Company, Inc.

### INDUSTRIAL GASES AND CARBIDE

The Linde Air Products Company  
The Oxweld Railroad Service Company  
The Prest-O-Lite Company, Inc.

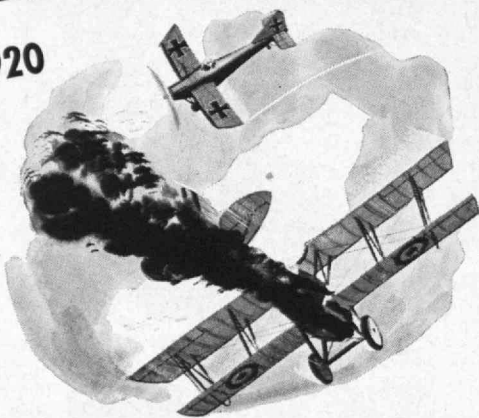
### PLASTICS

Bakelite Corporation  
Plastics Division of Carbide and Carbon  
Chemicals Corporation



# Trail Blazing in the Skies

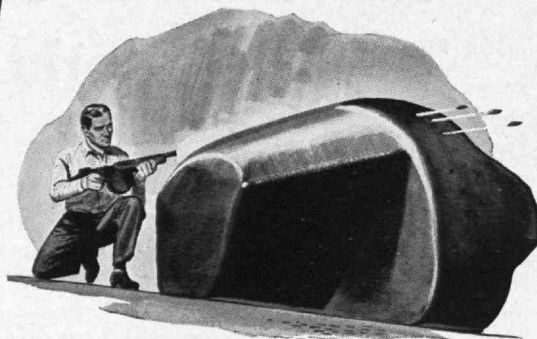
1920



## THE FIRST BULLET-PUNCTURE-SEALING GASOLINE TANK

for military airplanes was developed by Goodyear at the close of World War I. After exhaustive tests it was adopted by the Army Air Corps and Goodyear was officially commended in 1920 for its invention. That is a matter of record, as was its effectiveness in sealing punctures made by the small-caliber armament then carried by planes.

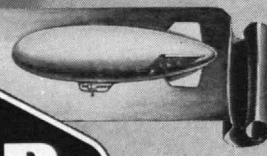
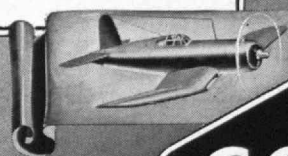
1943

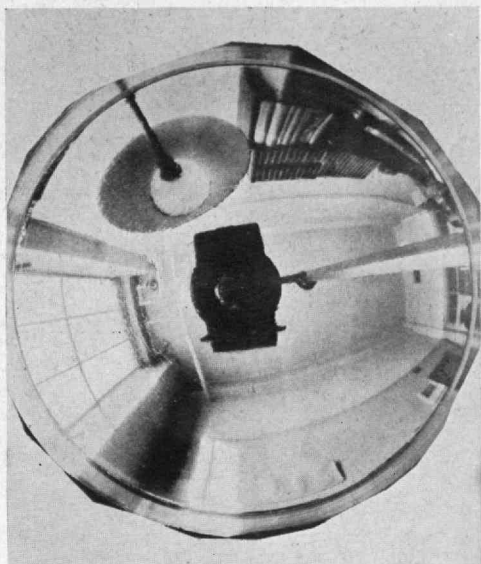


**AS A RESULT  
OF THIS EXPERIENCE,** Goodyear is today building bullet-puncture-sealing tanks that self-close punctures made by modern heavy-caliber ammunition which rips jagged, flaring holes in ordinary metal tanks. So swift is this sealing action, very little gas is lost and the danger of fire from incendiary bullets is greatly reduced. Goodyear supplies all types and sizes of these tanks to fit the varying needs of both fighter and bomber planes.

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VOLUME 45

NUMBER 7

# THE TECHNOLOGY REVIEW

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AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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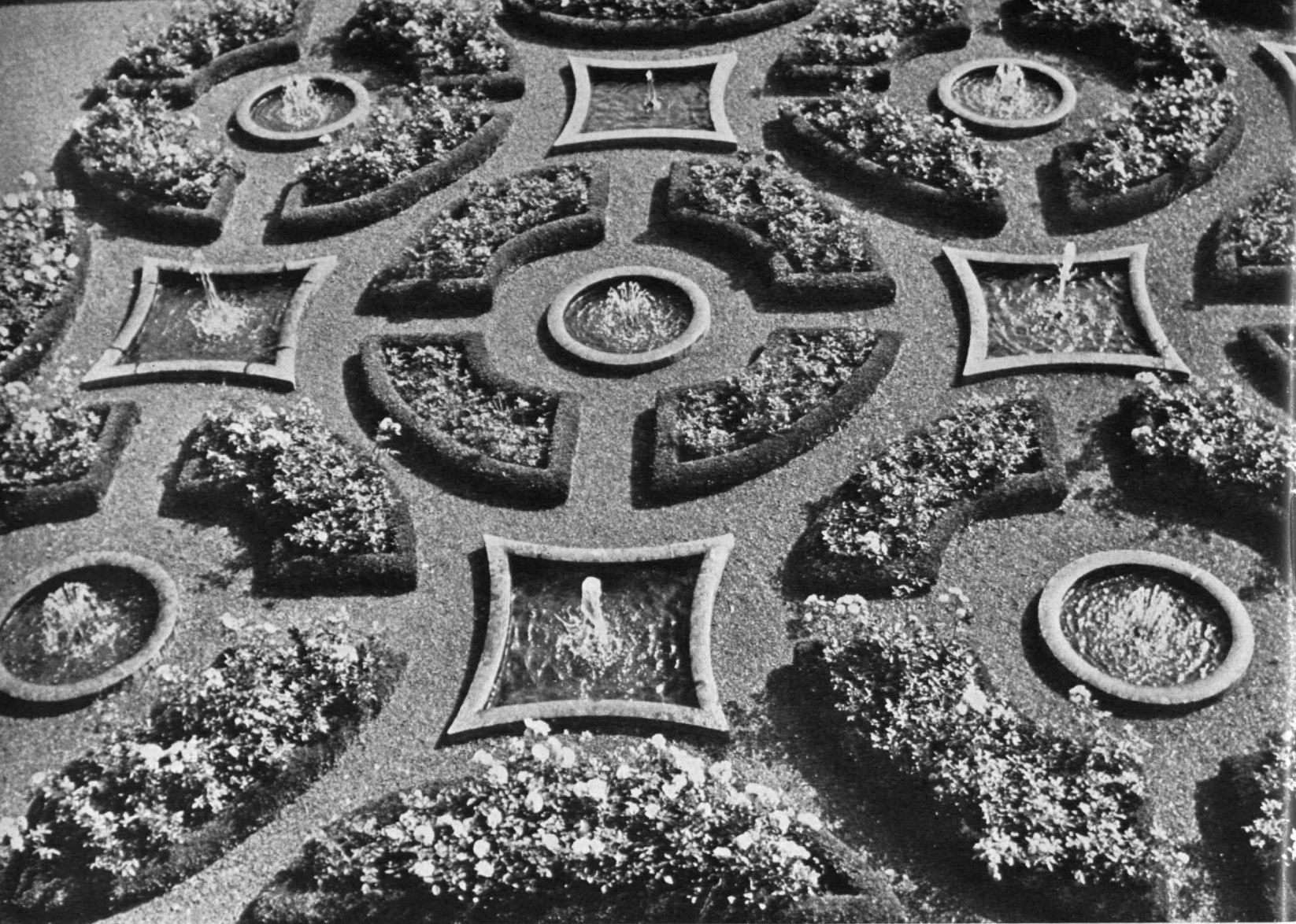
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*Wolff from Black Star*

*Spring, as a castle garden in Silesia once formalized it*

# THE TECHNOLOGY REVIEW

Vol. 45, No. 7



May, 1943

## The Trend of Affairs

### *The New Old*

THERE is always something new under the sun — at least, as far as socially desirable scientific research is concerned. At present, of course, many such projects are in abeyance because they cannot be directly related to the main task of winning the war. Among these deferred undertakings — not a few of which should be considered deferred obligations — one of the greatest urgency is that presented by the new old. Study of this problem merits the highest of priority among research to be resumed as soon as possible, for the new old exert already and will increasingly exert important influences upon the industrial, economic, and social aspects of our civilization.

The new old are people. Old people as such are nothing new. But old people in larger and larger proportion of the total population are decidedly new. From 1930 to 1940, the number of people 65 or over in the United States rose from 6,633,805 to 8,956,206 — an increase of 35 per cent as against an increase of but 7.2 per cent in the total population. During that same decade, the median age of the population of the United States increased from 26.4 to 28.9 years. Measured over a longer span, the figures continue significant: In 1900, people 45 years or over made up 17.8 per cent of the population of the country; in 1940, they constituted 26.5 per cent. Estimates of the Bureau of the Census, which assume no net immigration and assume continuation of present trends, foresee 40.4 per cent of the total population in 1980 as being 45 years or more in age. These figures are representative of the results of preventive medicine, sanitation, and greatly improved pediatrics. Prevention and better treatment of infective diseases, and better diet, have led to the increase of average life expectancy at birth from the 47 years of 1900 to the better than 62 years for white races at present.

Prime Minister Churchill put the problem in these terms recently: "In 30 years, unless present trends alter, a smaller working and fighting population will have to support and protect nearly twice as many old people; in 50 years the position will be worse still." A declining birth rate in Great Britain, which he declared to be "one of the most somber anxieties which beset those who look 30 or 40 or 50 years ahead," occasioned his statement of the problem. Recent Census Bureau announcement of an upswing in the birth rate in the United States — population gain during 1942 was at nearly twice the average annual gain for the decade 1930–1940 — is properly discounted on the ground that such increases are wartime phenomena, reflecting business prosperity and expected conscription. With the return of peace, restoration of the trend upset by this reversal may be foreseen, if indeed restoration of it does not occur earlier as a result of the dislocation of population attendant upon war.

The problem which the new old present, and for solution of which a broad program of gerontological research is needed, is not only that of forestalling the enormous economic cost to society which may otherwise be encountered. In the swiftly increasing reservoir of older people are great stores of wisdom, of skill, of judgment, of strength, the benefit of which society needs. Hence coherent and co-ordinated study of aging, study of the physical and mental aspects of normal senescence and senility, and study of the diseases, physical or mental, characteristic of the senescent period are important, the more so when one recalls that no such broad and thoroughgoing work has been done in geriatrics as in pediatrics, at the other end of man's span. Beyond the medical phase of the problem lie manifold socioeconomic questions which must be resolved both for the new old to be assured their rightful enjoyment of their own years and for society as a whole to be best served.



more than one-half again as many girls as men. Only one girl would be under 15, whereas 132 would be between 15 and 19, and 119 would be between 20 and 24. Such was the picture before war drained off millions of men of accession ages and sharply shifted the accession age of women. A major problem of the postwar years may well be how to bring employment tables back from their present unusual aspect and to improve upon past standards. The recession rate for various age groups by five-year periods is of equal importance with the accession rate. Table 1, based on the figures of the Social Security Board, shows the two rates:

TABLE 1

*Accession Rate per 1,000 Employees in Five-Year Periods*

Age	1,000 Employees	1,000 Male Employees	1,000 Female Employees
-15	+ 2	+ 2	+ 1
15-19	+ 90	+ 75	+132
20-24	+ 98	+ 90	+119
Total	+190	+167	+252

*Recession Rate per 1,000 Employees in Five-Year Periods*

Age	1,000 Employees	1,000 Male Employees	1,000 Female Employees
25-29	- 23	- 8	- 65
30-34	- 30	- 20	- 56
35-39	- 24	- 21	- 32
40-44	- 18	- 15	- 24
45-49	- 16	- 15	- 20
50-54	- 21	- 21	- 21
55-59	- 18	- 20	- 13
60-64	- 16	- 18	- 10
65-69	- 21	- 25	- 10
70+	- 3	- 4	- 1
Total	-190	-167	-252



Walt Sanders from Black Star  
Steam and smoke as towboats do their work

## Inventorizing the Labor Asset

BY HERBERT S. SWAN

UNREST among workers is a protest against inefficiency and waste in the utilization of labor. This fact is too frequently overlooked. Employees are regarded too much as auxiliaries of machines; emphasis is laid upon profitable employment of mechanical equipment rather than upon continuous employment of workers. Yet the latter measures the efficiency of industry not less, if indeed not more, than does the former.

Information upon the accession rate to employment, the recession rate from employment, the normal expectancy of employment, and the severance rate for different age groups—the basic yardsticks necessary for gauging the full employment of labor—should prove particularly valuable in solving labor problems in the postwar period. For this reason, data compiled by the Social Security Board portend much for the future; in effect, they implement our technique in striving for worth-while social objectives with a new tool. Statistical tables presented by this board, when worked up into new relationships, yield for the first time some vital facts relative to the labor asset in both state and nation.

For example, to maintain a peacetime labor force of 1,000 men apportioned among various age groups as males are apportioned in the entire labor force throughout the country, net over-all accession rates based on 1937 figures show that in each five-year period a manufacturer must hire 167 men. Two of these would be under 15 years of age; 75 would be between 15 and 19 years; 90, between 20 and 24 years. A work force of 1,000 women distributed in the same manner demands the employment of 252 girls every five years, slightly

The accession rate is principally important in what it shows as to the entrance age of new employees; the younger the entrants, the less well they are equipped to enter employment. The longer employment is deferred, provided the delay is utilized in getting added knowledge and vocational training, the better the applicant is equipped to assume responsibility and, therefore, to earn higher wages. Communities which graduate children at 15 years of age directly from elementary schools into business are, as a consequence, likely to remain regions with a rather elementary technique and low adaptability to changing requirements of industry.

The recession rate represents a minimum basic turnover rate in labor. Taken in conjunction with the accession rate, it affords a rough approximation of the average length of time a new entrant may be expected to continue employed, with his several employers taken collectively. When normal expectancy of employment is comparatively brief, the employer assumes a disproportionate expense in training new help.

Suppose a plant hires 1,000 new entrants into employment: How many will continue at work in each quinquennium? How many will be lost as a result of all causes? Table 2 gives the answer to these questions in terms of normal pre-war experience. It is based upon Social Security Board data and shows accession and recession rates per 1,000 new employees hired in the United States in 1937:

TABLE 2

Age	Accession Rate per 1,000 Employees			Distribution of 1,000 New Employees Hired		
	1,000 Employees	1,000 Male Employees	1,000 Female Employees	1,000 Employees	1,000 Male Employees	1,000 Female Employees
-15	+ 10	+ 12	+ 4	10	12	4
15-19	+ 474	+ 449	+ 524	474	449	524
20-24	+ 516	+ 539	+ 472	516	539	472
Total	+1,000	+1,000	+1,000	1,000	1,000	1,000

Age	Recession Rate per 1,000 Employees			Survivors of Original 1,000, End of Quinquennium		
	1,000 Employees	1,000 Male Employees	1,000 Female Employees	1,000 Employees	1,000 Male Employees	1,000 Female Employees
25-29	- 120	- 48	- 258	880	952	742
30-34	- 160	- 120	- 222	720	832	520
35-39	- 124	- 126	- 127	596	706	393
40-44	- 95	- 89	- 96	501	617	297
45-49	- 85	- 90	- 79	416	527	218
50-54	- 110	- 126	- 84	306	401	134
55-59	- 95	- 120	- 51	211	281	83
60-64	- 84	- 107	- 39	127	174	44
65-69	- 111	- 150	- 40	16	24	4
70+	- 16	- 24	- 4			
Total	-1,000	-1,000	-1,000			

The severance, or recession, rate is a law unto itself in each community. One would presume that it would increase with each successive age group. But curiously it is smaller for some intermediate than for some lower age groups. The fact that the recession rate for men between 45 and 49 is less than that between 35 and 39, and that the rate for women between 45 and 49 is appreciably less than that between 30 and 34 raises the question whether industry, in concentrating employment within low age groups, may not contribute to the unsettlement of the labor market, to industry's own disadvantage. In working against such concentration, the dislocations produced by the war may, strange as it may seem, exert a stabilizing influence upon employment.

As the ease of developing a skilled personnel in business increases directly with the normal expectancy of employment, so the cost of training workers up to a desired standard of skill increases with the rapidity at which replacements must be made to maintain personnel. Here again the accession and recession rates offer interesting data. Normal expectancy of employment in the country as a whole for both sexes is about 26.3 years; for males alone, it rises to 33 years; for females alone, it is only 20 years. In different states the average varies widely — for men, from 22.8 years in South Carolina to 33.6 years in New York; for women, from 16.5 years in North Dakota to 24.6 years in Maine. The effect of such differences is that an employing organization, in order to maintain a labor force of 1,000 men with the same age distribution as that of its state, has annually to employ only 29.8 men in New York as against 43.8 in South Carolina. For every 100 new men hired in New York to replenish the force, 147 would have to be hired in South Carolina. A high turnover rate measures the inefficient use of labor.

Many maladjustments in employment have been due to lack of data showing blacked-out areas in the labor market passed over in the current use of labor. As a result of inadequate information, business may concentrate demand for labor within limited age groups of either or both sexes and so create acute shortages in particular sectors of the market while at that very



Roy Pinney from Black Star

*Moonlight and gentle breeze as the schooner comes in*

moment an abundance of workers, in a different age or sex group, may be seeking employment. Study of accession and recession rates should help to direct enterprise intelligently into unexploited sectors of the employment structure and should prove especially useful in meeting the difficult readjustment necessary after the war.

### *Hold with Hope*

THE shortest air route from Seattle to Moscow lies over Greenland. That from New York to China lies over Alaska. Air power is putting a new aspect on geography, a truly global aspect that no map based on the Mercator projection can convey. Because of the airplane's ability to fly great circle routes indifferent alike to land and water barriers, arctic lands are increasing in importance both strategically and economically.

Americans are therefore taking a new interest in Denmark's Greenland, the largest European-held area in the Western Hemisphere and the largest island in the world. Denmark's title to it is as strong as any small nation's could well be: In 1916, when purchasing the Virgin Islands from Denmark, the United States formally relinquished all claims to the land in northern Greenland which Peary had discovered, and in 1933, after a dispute between Denmark and Norway over eastern Greenland, the Permanent Court of International Justice confirmed Denmark's title. As for western and southern Greenland, Denmark in recent decades has there performed one of history's outstanding examples of humane and intelligent colonial administration. Apropos of these well-known and doubtlessly dull data occurs the possibility that if the airplanes of the post-



war world are going to flit about over Greenland's rather astounding scenery, we may see the opening of new meccas for tourists (and this applies to other lands), as areas requiring the utmost fortitude to reach by land or sea become reasonably accessible by air. One such area may be the fiord region of east Greenland — the largest, the most complex, and, if the camera does not lie, the most awe-inspiring system of fiords in existence.

To date, this region lying between 70 and 74 degrees north has been visited almost exclusively by people with a strong professional reason for going there — explorers, whalers, and scientists — and then almost invariably during Greenland's short summer. A belt of pack-ice guards the coast during the rest of the year, and although Stefansson argues to the contrary, many travelers regard the east coast of Greenland as inaccessible by sea at that time. The west coast — that facing Canada — is much easier to reach, and some harbors to the southwest are free from ice all year. It appears possible, however, to land planes on the icecap of interior Greenland and on the still water of the fiords when they are clear of ice.

Some of the fiords of the east Greenland coast penetrate for hundreds of miles into a high plateau and may well extend much farther back from their present heads, completely covered by ice. Many of the fiords seem to be valleys scoured out by tremendous ice rivers fed by the deep icecap that covers the entire interior of Greenland to a depth of many thousands of feet. Scoresby Sound, the world's longest fiord, is 186 miles long and at some points almost a mile deep. Farther north lies the Franz Josef Fiord, the upper end of which has been likened to an arm of the sea half a mile deep lying in the bottom of the Grand Canyon. One feature of this latter fiord is an enormous granite cliff which shoots up from the water in a steep curve to almost 6,000 feet. Appropriately, this precipice bears the name "Attestupan," which in Viking mythology is the cliff over which those tired of life through old age, sickness, or any other reason flung themselves to death.

Greenland has been known to the world for a surprisingly long time. Because of its closeness to Europe, it was visited and settled by white men long before any other part of the Americas had been seen. The east coast, however, was apparently as unattractive for settlement to the whites as to the Eskimos, and only legends remain of the various Vikings, Irishmen, and Icelanders who may have seen those shores during the Middle Ages. Many whalers saw the fiord region during the Seventeenth and Eighteenth centuries. Indicating the frequency of these visits is the fact that in 1777 almost 50 whaleships were crushed in the ice, with over 400 men eventually perishing. The Nineteenth Century witnessed the beginning of more accurate exploratory work which, with fewer and fewer interruptions, merged into the detailed and multifaceted investigations of the present day.

But the greatest name in the exploration of the fiord region is still that of Henry Hudson, who in 1607, attempting to reach Cathay by sailing across the North Pole, sailed up the east coast of Greenland as far as 73 degrees 30 minutes north. There he sighted a range of

high hills and called them, in vigorous Elizabethan English, "Hold with Hope," a name that can well be taken as a motto by all nations with arctic possessions.

### *Mars, Merchandiser*

That values shift in time of war is a truism often newsworthily illustrated these days. Bolstering data range from those asserting the prime virtues of the salvaged tin can to those emphasizing to schoolmasters that one of the nation's serious shortages is of men who can write clear, direct English about the techniques essential to winning a war of machines and instruments. The latter situation is worth the passing remark that Mars himself is in considerable measure to blame for it. It was the first World War that succeeded in breaking down once and for all the tradition of hardheaded newspaper anonymity which focused everything on plain factual writing — objective "straight reporting" was the term — and in replacing it with first-person signed stories, precursors of book after book on such subjective topics as how it feels to be the son of a rural dogcatcher. This sort of thing as a literary mode is all very well, but it is not calculated to foster good writing about how to net an obstreperous cur or, in fact, how to do much of anything else.

But we are here concerned with far less subtle shifts of value — interested, rather, in the fact that milkweed floss and cattails are articles of commerce and that the lowly mussel of the Maine Coast, being packed as lend-lease food for shipment abroad, has become basis of an industry.

The life belts and floats that once were stuffed with kapok now rely on the silky floss of the milkweed — 50,000 pounds of it were so used last year. Entire output of the processing plant established by Dr. Boris Berkman, a Russian military surgeon in the first World War, has been taken by the government. The seed which are separated from the floss have been found to be the source of an oil resembling soybean oil in properties and possible uses. The pod shells and the stalks may provide other by-products. Land too poor to support anything else finds its value augmented by this demand for milkweed; farmers who picked pods last year for the factory earned from four to seven dollars a day.

The floss of the ubiquitous cattail — remember how aesthetic maiden aunts used to gild them with radiator paint? — is used for the same purposes as is the milkweed floss — for life belts and floats, for insulation of heat and sound, for padding and filling. Cattail floss, it is reported, can compete with cotton on the basis of cost per pound.

Mussels, which West Coast Indians ate with relish early in the last century, rejecting the clams which their East Coast contemporaries preferred, are being packed in jars and cans, fresh frozen, or shipped fresh. They are said to be of richer flavor and higher food value than clams, and can be gathered with less equipment and trouble. Maine fishermen are expecting to take 200,000 bushels this spring, which will be the largest crop in United States history. Mussels, which are plentiful along the Maine Coast, were formerly used only for bait.

# Cinderella Starch

## *Increasing Knowledge of Its Structure and Properties Is Expected to Make the Starch Molecule of Greater Use in Chemical Industries*

By RICHARD S. BEAR

**A**MONG the family of organic raw materials is one which, like the legendary Cinderella, is kept close to the humdrum affairs of life and is not often allowed into the more romantic, hence lucrative, processes of chemical industry. This Cinderella is starch. Recently an executive of the starch industry was heard to lament that his product, aside from its uses as food, is too often only a filler or binder for other substances and as such escapes the limelight of industrial attention and esteem.

One of the reasons for this situation is that of economy. The "stepsisters," or chief competitors, of starch are cellulose and petroleum. On the basis of dollar-a-bushel corn, starch is available at about two cents a pound as compared to four cents for wood cellulose of comparable purity. Petroleum, however, costs normally about half a cent a pound and hence has an initial advantage over the two carbohydrates. Nevertheless, all three raw materials may be regarded as cheap enough so that processing costs may decide in some instances which material is to be employed.

In spite of the cost handicap that hinders starch in its competition with petroleum, our chemical Cinderella may come into her own sooner than might have been expected, unless rumors that present oil shortages are not merely temporary shall prove to be false. Both of the carbohydrates, cellulose and starch, come from an annually replenished source of supply, so that in using them we are living upon an inexhaustible income rather than wasting our capital resources, which petroleum supplies must be regarded to be.

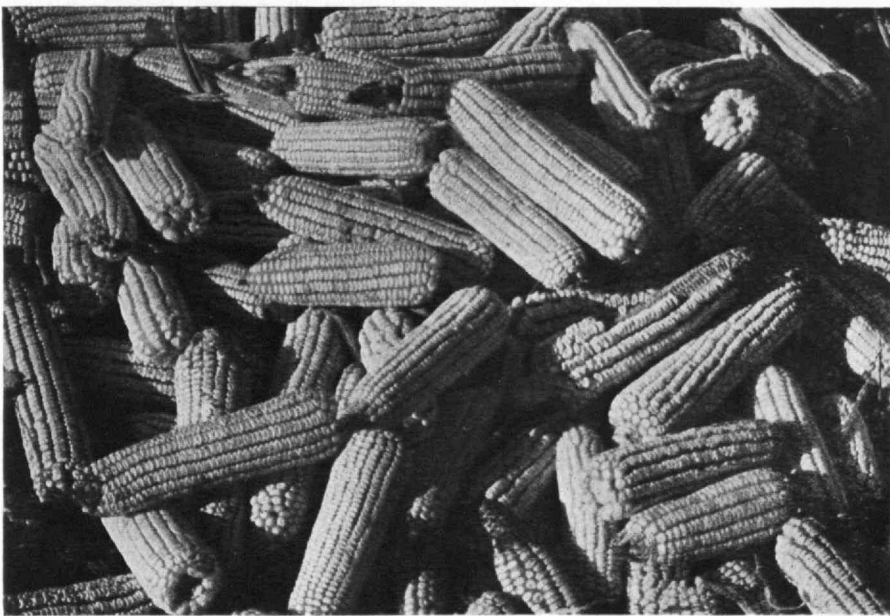
In the meantime, the "fairy god-mother" planning for the future of starch is the industry most intimately connected with the production of it. Two-thirds of the solid matter obtainable from the corn grain is starch; hence the interest of the corn industries in Cinderella is understandable. Many of the common problems in pure and applied science which these industries face are the chief concern of the Corn Industries Research Foundation, which is maintained jointly by the interested companies. Norman F. Kennedy, director of

research for the foundation, has expressed his organization's chief problem as follows: "In recent years the industry has become certain that its future expansion will depend largely on the chemical uses which can be developed from starch as an organic raw material."

Starch has in the past seen no inconsiderable application to various industries, such as those producing food, paper, and textiles. Outside of the food applications, however, most of these industries employ only certain of the physical properties of starch which make it suitable for sizing, filling, binding, or other operations that might in general be termed colloidal applications. To this end only mild chemical alterations of the starch molecule are ordinarily introduced.

The future looks to the employment of more drastic chemical modifications of starch. Anticipated are a host of chemical products, most of them obtained by way of simpler molecules, commonly those of the corn sugar, dextrose, or of grain alcohol and other less well-known alcohols. Substances of present-day importance, such as vitamin C and synthetic rubber, are in this list. Many of them now, however, are to be regarded as possibilities rather than commercially proved actualities.

From another point of view, the treatment of starch as a neglected "stepchild" of industry may be taken as an example of the fact that what man does not under-



One of Cinderella's dwelling places. Two-thirds of the solid matter obtainable from corn grain is starch.

Science News Letter



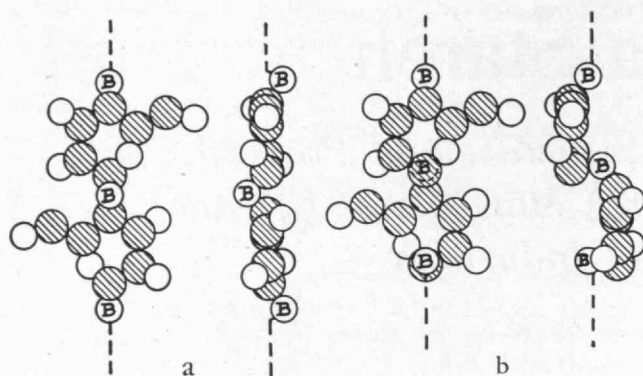


Fig. 1. Models showing both front and side views of the molecular chains of cellulose (a) and starch (b) in the maximally extended condition. The complete molecular chain of each can be visualized as resulting from a multifold repetition, along the dotted lines, of the two adjacent dextrose units actually depicted. Shaded circles represent carbon atoms; open circles, oxygen. Hydrogen atoms, which are present but not involved in the chain "skeleton," are omitted to avoid confusion. Dextrose units are joined by the oxygen atoms marked B. The spatial relation between each of these bridging atoms and the carbon atom next above it along the chain direction of the figure determines many of the differences between cellulose and starch.

stand very well he is incapable of effectively utilizing. The story is told that some years ago in celebration of a birthday anniversary of the great chemist, Emil Fischer, his students staged a playlet in which various simple sugar molecules were personified and put through paces illustrative of their chemical reactions. Starch was represented only by sweet music off stage, reflecting the mystery attached to it.

Throughout the history of scientific investigation of it, starch has presented especially puzzling problems which have retarded the attainment of any very complete understanding of the diverse phenomena that it presents. Notwithstanding the difficulties, recent years have finally been marked by great advances in our knowledge. Some of this fascinating story is told here, with an attempt to indicate as non-technically as possible the main paths along which progress has been attained.

**C**ELLULOSE and starch, both plant products, are very much alike chemically, consisting of long chains of ring-shaped sugar (dextrose) molecules joined

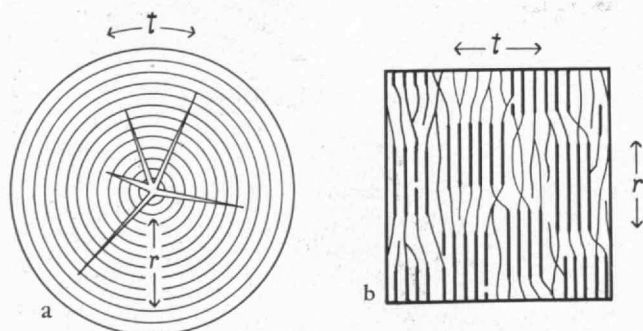


Fig. 2. Diagrams of a starch granule (a), with layered structure and radial fissures, and of a highly magnified portion of a layer (b), showing ramification and interweaving of chains, which tie together more regular "crystalline" regions. The latter are represented by heavy lines. Arrows marked *r* and *t* show respective radial (or longitudinal) and tangential (or lateral) directions, as these terms are employed in the text.

together by bridges consisting of an oxygen atom each. Starch differs from cellulose in the precise spatial arrangement of the bridging oxygen atoms, a small difference which is nevertheless very important in determining their respective properties (see Fig. 1). Cellulose molecules may be thought of as long ribbons, since the cellulose bridges permit dextrose rings to lie pretty much in one plane. The starch chain is a puckered ribbon, because adjacent dextrose molecules are not permitted by their bridge to extend in the same plane. In addition, a certain variety of starch molecule possesses branched chains, with occasional dextrose units attached to more than the usual two neighbors.

Of equal importance with the precise knowledge of the chemical nature of starch is some conception of the way in which individual chain molecules become contorted or aggregate, for it is in the variety of forms they are capable of assuming that the starch molecules present their bewildering array of aspect. This phase of the subject forms the present story.

While cellulose serves as the skeletal material of plants, starch forms the reserve food supply, distributed widely through each plant but particularly stored in seeds and in roots or tubers. In green parts of the plant, the starch granules are closely associated with the green chloroplasts, where the important phenomenon of photosynthesis occurs. The starch granule possesses, therefore, a very close relation to the primary processes by means of which the sun's energy is converted and stored in a chemical package.

The starch granule is the form in which man, so to speak, mines this product from natural sources — fruits, seeds, and tubers. Refining processes separate the extraneous plant structures and leave the small, spherical (corn), disk-shaped (wheat), rodlike (banana), or egg-shaped (potato) particles, which are small glass-clear beads a few ten- or hundred-thousandths of an inch in diameter. These constitute the powders of commercial corn, potato, or other starch.

The scientist begins his attack on the starch structure with the granule. By ordinary microscopic observation he can see that the granule possesses a faintly visible layered structure, similar on a small scale to that of an onion, the layers of a pearl, or the annual rings of a tree. In fact, he feels that diurnal periodicity in the growth of the granule is responsible, since these layers are not produced when plants grow under constant illumination. Fundamentally, therefore, the layers are not very significant.

More important is the observation that when attempts are made to crush the granule, or when the granule is excessively dried, it has a tendency to split radially, i.e., along lines from the center to the periphery, as shown in Fig. 2a. Study of the granules with polarized light makes plain why this radial splitting occurs. With polarized light the granule can be shown to have the ability to refract doubly, or to "bend" light, and the way in which this double refraction occurs points to the conception that the long, chainlike starch molecules are oriented radially in the granule. These molecular chains are more easily parted from each other laterally than broken longitudinally; hence the development of the radial rifts.

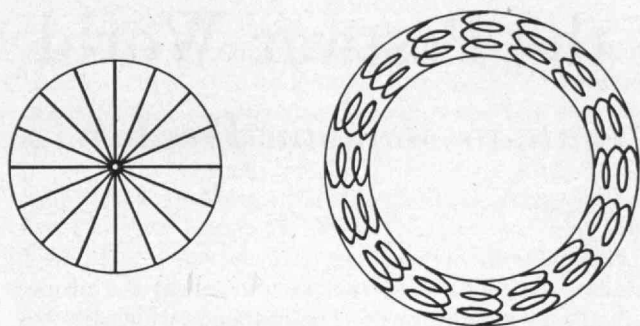


Fig. 3. A model to illustrate the mode of expansion of a starch granule during gelatinization. On the left is the original granule with radially extended molecular chains. After gelatinization these have contracted and thickened, as shown on the right, to increase peripheral area and develop an interior cavity, which becomes filled with fluid drawn in from the environment.

X-rays, another of the scientific agents useful in studying the fine structure of materials, add more details to the story. Since the starch granules diffract x-rays nicely, the parallel molecular chains must, at least along parts of their lengths, be arranged with a regularity of structure surpassing that of simple molecular orientation. In other words, occasionally in local regions of submicroscopic size the parallel chains enter into crystalline perfection of arrangement.

The regularly repeated atomic spacings of the crystalline regions of the granule, however, extend over domains small in comparison to what the length of an individual starch chain may be expected to be. With this fact in mind, it is concluded that one chain may be a part of a number of crystalline regions, thus serving to tie these together (see Fig. 2b).

The entire granule, then, is a network of little crystalline portions tied together by ribbons of starch chain. As a consequence, it has a rather compact structure and resists penetration into its interstices by what the chemist calls nonpolar (oil-loving) solvents; only those described as polar (water loving), such as water itself, can enter and cause chemical reactions, alterations in physical properties, or changes in volume.

The relations of starch and water are particularly important, as the x-ray diffraction patterns also show.

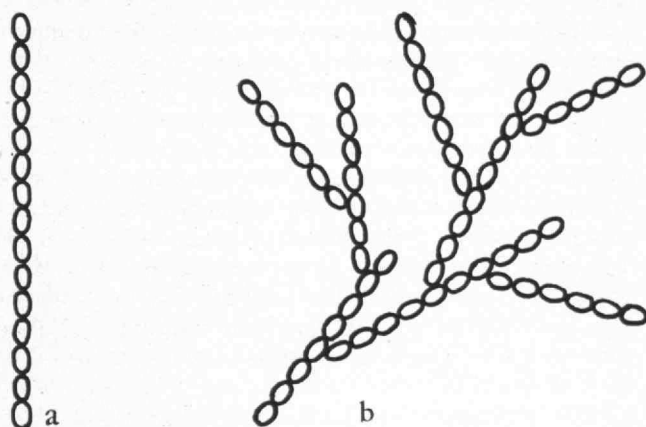


Fig. 4. Diagrams representing the difference between molecules of amylose (a) and amylopectin (b). Each oval is a dextrose unit. Actually the real molecules possess many more units (see text).

If the distinct crystalline starch patterns are to be obtained, the moisture content of the granules must not be too low. In this respect, starch granules behave like simpler crystalline hydrates. The inference is that water molecules form an important part of the starch crystal, perhaps serving to associate the starch chains laterally.

Diffraction patterns of different types of starch granule — for example, those of the cereal grains as distinguished from those of tubers (potato) — show variations that parallel roughly some of the industrially significant properties of the granule types. Under appropriate conditions, one crystalline modification of the granule can be changed into the other, with a corresponding alteration in granule properties. Such changes offer the possibility of converting one, perhaps inexpensive, granule type into another with more desirable characteristics normally possessed by material of greater value.

**P**ERHAPS the most striking of all phenomena exhibited by starch granules is their capacity to act as self-inflating balloons, to which process the starch chemist applies the name "gelatinization." When heated

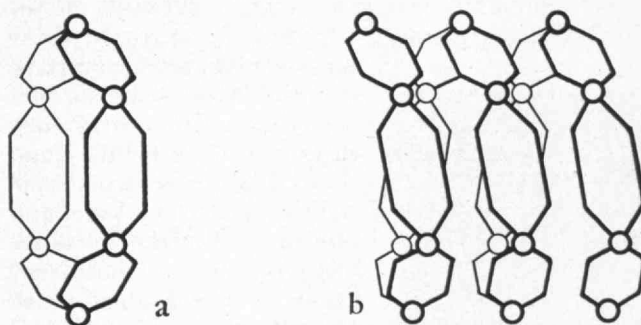


Fig. 5. Side views showing the relationship between the ring-shaped cyclo-hexa-amylose molecule (Schardinger a dextrin), a, and a portion of a starch chain helix, b. The hexagons represent dextrose units, joined at opposite corners by circles, or oxygen bridges. Heavy lines indicate units extending before the plane of the figure, light lines those behind this plane.

in aqueous suspension (80 to 100 degrees Centigrade), granules of each type at a characteristic temperature begin to expand and continue to do so until volumes of perhaps more than 40 times the original are attained. In the end, each granule appears as a thin-walled sack containing a dilute starch solution. Because of the great increase in volume, relatively dilute granule suspensions after gelatinization find swollen sack walls in contact, so that flow is impeded and a stiff jelly is produced. This is what happens when starch puddings are prepared in the kitchen.

The molecular changes taking place during gelatinization are not well understood, but it seems clear that the remarkable expansion of the granule does not occur merely by its thirstily taking in water to produce internal pressure which pushes the walls out. If this were the situation, the chemist would expect heat energy to be liberated during the process, whereas heat is known to be used up. Rather the molecular chains, radially arranged in the granule, appear to be like extended springs which contract sharply when temperature agitation causes them to be released from (Continued on page 376)



# Science and Society in the Postwar World

## *Arts, Letters, and Sciences Must Unite to Maintain Freedom*

BY JAMES B. CONANT

IT may seem to some of you like tempting fate to talk not about the total war in which we are now engaged, but rather about the postvictory world.\* Indeed, there are many days when I share this mood, for perhaps too many people are now planning rabbit stew before we have caught the rabbit. We must all agree that there is just one immediate goal before us: an unconditional surrender of the Axis powers in the shortest space of time. And before that goal is reached, sorrow, suffering, and misery will be the lot of many in these United States. Yet no sacrifice can be too great which the military may demand, for only by the strength of arms can we shorten the present agony of the world.

It is not my purpose to speak of the war's devastating effect on the colleges and on the universities of the land. For the moment, the creative activities of the

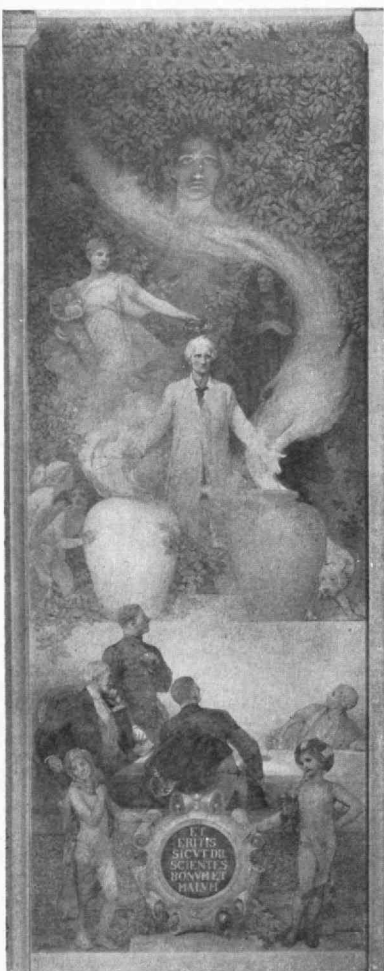
scholar in the arts, the letters, and the sciences are at best confined and cramped, in many cases suspended for the duration. Of these war casualties in the academic field I do not propose to speak. But there is one relatively minor disturbance caused by the war, about which I should like to address a word to this joint meeting of Sigma Xi and Phi Beta Kappa. The war now threatens to stir up the smoldering embers of a feud that should have died at least 50 years ago. For generations there have been those on every campus who wished to place the natural sciences and the humanities at antithetical poles. In recent years these old academic quarrels have tended to disappear, yet now we see signs of a renewal of the controversy. I am sure this audience of scholars agrees that the whole idea of a dichotomy between science and the liberal arts is foolish. Everyone admits that the present necessary emphasis on scientific and technical training in preparation for war distorts completely our

educational picture. In the postwar world the proper balance must be restored. The challenge which lies before our faculties, therefore, is not to adjudicate an issue as to which of two branches of learning shall stand at the top of the academic hierarchy. Our challenge is to find the ways of combining the study of both man and nature for the maintenance of the ideals of freedom on this continent for the generations yet to come.

In this year when we are celebrating the bicentennial of the birth of Thomas Jefferson, it is perhaps appropriate to take as a text for a discussion of science and society a quotation from his works. Those of you who have enjoyed the recent book, *Jefferson Himself*, will remember the extract from Jefferson's letter to President Willard of Harvard College written on March 24, 1789, from Paris:

"What a field have we at our doors to signalize ourselves in! The botany of America is far from being exhausted, its mineralogy is untouched, and its natural history or zoology totally mistaken and misrepresented. . . . It is the work to which the young men whom you [at Harvard] are forming should lay their hands. We have spent the prime of our lives in procuring them the precious blessing of liberty. Let them spend theirs in showing that it is the great parent of *science* and of virtue; and that a nation will be great in both always in proportion as it is free."

The cause of freedom is at this moment threatened by a force beyond even Jefferson's power of imagination. To combat this evil force, applied science in the hands of free men is a priceless weapon. For the moment, therefore, the engineers and physicists can make through their professions a special and invaluable contribution to the national effort, though, of course, the advancement of science in all but an extremely limited direction must thus all but cease. After the war is over, we as a nation shall also need the services of the applied sciences — not for war but to improve the arts of peace. But in that task if the scientist serves alone, he fails. Technological advances based on the discoveries of science will be as essential in the future as in the past to provide the basis for the continuing growth of our modern civilization. Through many advances gained by science, we may hope that as never before man may be free — free from want. But science alone, untempered by other knowledge, can lead not to freedom but to slavery. This the totalitarian countries have demonstrated beyond doubt or question. Therefore, at the root of the relation between science and society in the postwar world must lie a proper educational concept of the interconnection of our new scientific knowledge and our older humanistic studies. Teachers of the social sciences and the humanities can hardly relate their teaching to the present if they are ignorant of one of the forces which



From the Blaschfield murals in Morss Hall, Walker Memorial, Science is symbolized with its powers for good or ill . . .

\* This article is drawn from an address delivered by Dr. Conant at a joint meeting of the Harvard chapters of Sigma Xi and Phi Beta Kappa on April 5. — Ed.

has reshaped our world. Those skilled in the natural sciences and their application, on the other hand, must be so educated as to understand not only how inanimate materials can be shaped to human usage but how men and women can work together for the maintenance of a nation that is truly free. It is for these reasons that I take it as a good omen that the two companies of scholars, Phi Beta Kappa and Sigma Xi, have met together. I count it a special privilege to be on the platform. I can only hope this new battalion of arts, letters, and the sciences may remain united through war and peace. . . .

It is my thesis that in one respect the future will be like the past. If we are to have a free society on this continent, we must continue to have advances in the fundamental sciences, and these advances in turn can take place only if man is free. It matters little whether we argue for personal liberty so that science and other activities of the creative human mind will prosper, or whether we argue that only through a nourishing of such activities can we have continued freedom in this land. Only let no man who admires science or extols new industrial techniques look with favor on any abridgment of human liberty unless he wishes to encourage forces which will eventually destroy those things he values most. Likewise, let no one primarily concerned with the freedom of individuals attempt to check scientific progress unless he wishes to eliminate a vital part of the chain on which depend his most cherished aspirations.

If I were addressing only engineers and physical scientists, I would urge that as they value the future of their own enthusiasms, they must be concerned with the social and political problems of tomorrow. For unless these problems can be solved, liberty will go. If I were addressing only social scientists concerned with planning the postwar world, I would urge that they provide for a flourishing condition of research and development of new inventions. For I would say that without the products of such research their postwar world cannot meet the conditions of survival. In short, in the postwar world a free society will require technological and scientific progress, and research and development in turn will require a free society. Such is the essence of my argument — of the small segment which I have carved out of my larger title to discuss.

It is not for me to attempt here to suggest the way in which our industrial society must be organized to insure the maximum distribution of the goods we can now so readily manufacture, though unless we have a proper distribution, our freedom will not long endure. Nor is this the place to discuss the difficult problems of arranging for a peaceful international order, though a successful solution of these problems is a prerequisite for the maintenance of our liberty. We cannot maintain a free society in a world in which we must face the terrible and disrupting burdens of modern war once every generation. I am going to confine myself to a discussion of the conditions which I believe must be met if research in the physical sciences and the developments based on research are to prosper in the United States in the postwar world.

In the first place, if scientific work is to prosper we must recognize the prime significance of the exceptional man. Research and development of new scientific ideas

are original work — a work in which only a few have the talent to be real leaders. Ten second-rate men are not a substitute for one first-class man. You cannot make up for lack of quality by increasing the quantity of scientific work. It is of the first importance, therefore, to provide a flexible organization for the research work of the nation. Those in each generation who can “turn the unexpected corner” must be given an opportunity to use their special gifts. Andrew Carnegie, in founding the institution which bears his name, stated that one of the two aims of the new research foundation should be: “To discover the exceptional man in every department of study, whenever and wherever found . . . and enable him to make the work for which he seems specially designed his life work.” I suggest this statement might stand first in the aims of a country which wishes to encourage science and engineering.

The second proposition which I should inscribe on a charter of a nation's scientific effort would be the necessity for scientific competition. In the days of peace we heard occasional laments about the duplication of scientific effort. That there was in certain areas reason for such lamentation we may perhaps admit. But few who worry on this score realize that unless a number of able teams of scientists are working in each major field, progress is almost certain to be slow. No single scientist is wise enough — not even the exceptional man — to see all the implications in the new facts which are daily uncovered on the frontiers of science. No one group is able enough to explore adequately all the new paths that open. And scientists are human beings subject to the same motivations as the rest of men. The spirit of emulation is strong; the desire to be first in the race is there. If society is to benefit from the zest of the adventure, we must provide a proper environment for research. We must provide that many groups of able men will compete with each other to see who can contribute the most to the advancement of their chosen field.

The third proposition relates to the fact that in almost all fields of the natural sciences the day of the lone worker with scanty equipment has long since passed. In physics, in chemistry, in biology, in medicine, in all the branches of the applied sciences, we must have groups of men well supplied with laboratories and equipment. The sums of money involved are large. In the 1950's they will be larger (Continued on page 388)



. . . and Humanity here is represented as being conducted forward from chaos to light by Knowledge and Imagination.



# Shall We Ration Crowding?

## *Dwelling Space Is Packed Not for Congestion's Sake but for Convenience; Standards of Population Density Must Be Established*

BY FREDERICK J. ADAMS

A GREAT deal of publicity has been given in recent months to the urgent need for preparing plans for the rebuilding of our cities in order that blueprints and cost estimates may be made ready against the day when the man-power problem will be that of finding work for our men rather than men for our work. This day will come, perhaps unexpectedly, and there is no doubt that one of the greatest obstacles to the provision of a decent standard of living for many millions of our citizens would be removed if some of the man power available after the war were utilized on an intelligently directed and comprehensive program of urban reconstruction.\*

Can scientific methods be applied to the replanning and rebuilding of our cities to the same extent as in the design of highways, bridges, and tunnels, and in the working out of solutions to other problems of municipal engineering? We are forced to admit that we are not on such sure ground when we get to the form, pattern, or arrangement of the future city, because the physical and economic factors are so frequently controlled or limited by social considerations. Qualitative criteria are more elusive than quantitative standards, and both are dependent to a greater or lesser extent on the state of public opinion. What standards will the voting and tax-paying citizens accept? And are they likely to approve of higher standards tomorrow than they do today? At least in one direction the consensus, expert and otherwise, seems to be practically unanimous and that is in regard to the evils attendant on the overcrowding of land, whether by people or buildings, and it is in this direction, among others, that quantitative standards based on objective analyses are needed.

Before we attempt to set up such standards, we must face the fact that there is a fundamental conflict between economic and social considerations which has to be resolved before any progress can be made. Despite the adoption of more or less restrictive zoning ordinances during the last 25 years, the major factor in determining the intensity of land crowding is still the so-called real value of land. A private builder or promoter knows that in order to get a satisfactory return on his investment, he must maintain an easily computed relationship between the total rentable floor space of his building and the cost of the site. In other words, the land value is allowed to

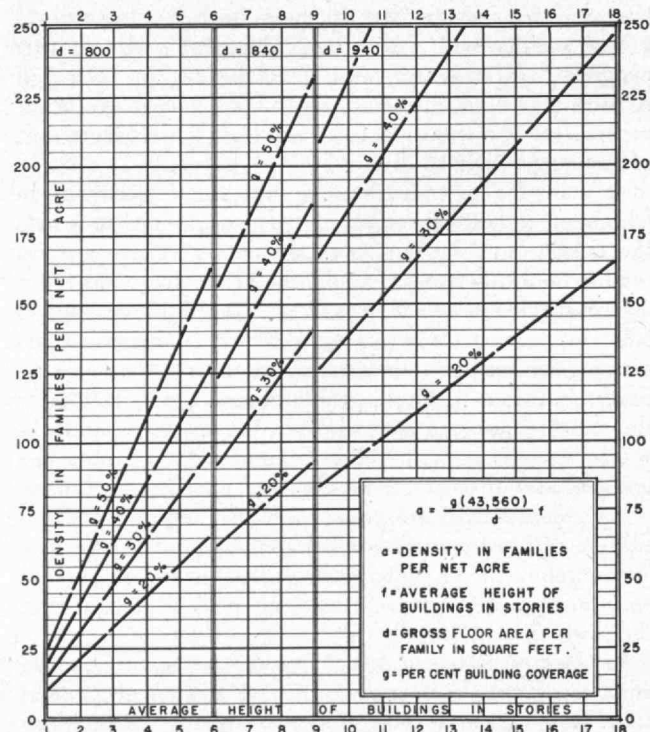
dictate the so-called economic height and coverage of a building. In a rising market, such as we had in the 1920's, higher building densities brought about higher land valuations, so that a vicious circle was started which, despite the depression, has not yet been broken. We now find ourselves in a position where substantial portions of our urban blighted districts are being held by the owners, and taxed by the municipalities, at prices which have no relation to the ability of the land to produce revenue. To recognize these inflated values as an appropriate basis for computing reasonable population densities to be applied to the future development of our urban areas would be like trying to rectify an error by canceling it with another.

The alternative open to us seems to be either to continue allowing population densities in urban residential areas to be determined by the laws of the market place, or else to adopt criteria based on the minimum requirements of everyday living. People do not live in crowded

DENSITY STANDARDS FOR MULTI-FAMILY RESIDENTIAL AREAS

### CHART I

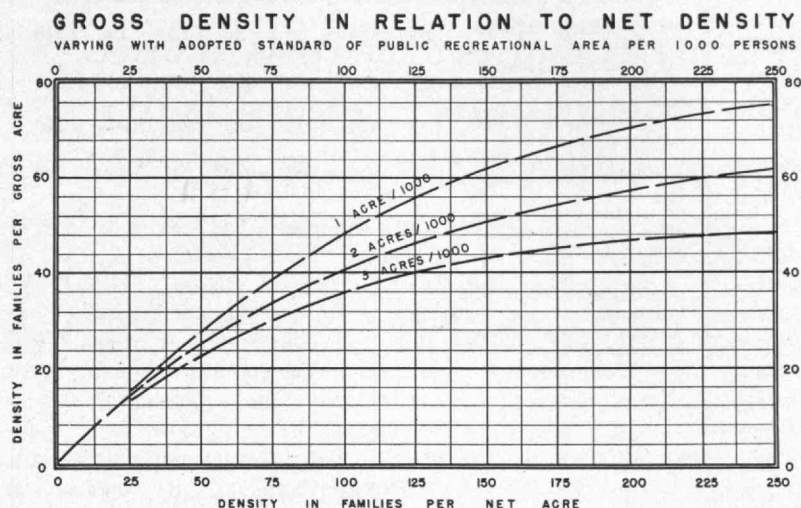
DENSITIES PER NET ACRE  
IN RELATION TO HEIGHT AND COVERAGE OF BUILDINGS



\* The statistical material presented in this article was prepared by the author for consideration by the American Public Health Association's committee on the hygiene of housing and particularly by its subcommittee on environmental standards for residential areas, of which the author is chairman.

## DENSITY STANDARDS FOR MULTI-FAMILY RESIDENTIAL AREAS

## C H A R T II



neighborhoods because of the congestion but because of the convenience of location. It is not even reasonable to assume that the prevalence of apartment houses in our large cities is because most urban families prefer that manner of living. More likely assumptions are that this form of structure was elected by the developer as the most profitable type of residential building (i.e., the type which can carry the highest amount of land cost) and that the choice of many families who wish to locate in a specific section of a city is between one multifamily building and another rather than between an apartment and some other type of dwelling.

The very fact that our blighted urban residential districts are frequently overpopulated and overpriced means that without some form of subsidy they cannot be cleared away and rebuilt with new structures, however high the density, to house the same economic group that now resides in these areas. Annual charges on construction costs alone would normally absorb more than the income from a low-rent project which has to pay the usual financing charges, taxes, and operating costs. If we are going to make any attempt to rehouse a substantial proportion of families now living in sub-standard conditions, we may as well face at the start the fact that we cannot put the program on a self-liquidating basis — and if we then realize that it is primarily the high land cost which has to be subsidized (whether by a governmental or a philanthropic agency), we have little excuse for adopting density standards which would make possible the development of anything other than a desirable neighborhood pattern.

What is a “desirable neighborhood pattern” and can it be put into quantitative terms which will stand close inspection? To answer these questions is not an easy job, and yet for want of a serious attempt at an answer city planners have been criticized as opposing the overcrowding of land without being willing to state specifically what they

mean by “overcrowding.”\* Before a suitable over-all density standard can be determined, the spatial requirements of a neighborhood must be classified by function and size. It is not difficult to segregate three primary elements which combine to form the neighborhood environment for family living and for which minimum areas per room or per family must be established, namely, (1) buildable land — defined for our present purpose as “net area”; (2) streets; and (3) land set aside for recreational use. The charts on these pages and the tables grouped on page 370 are based on the family as the unit for which appropriate space allocations are made; estimates of density in terms of families-per-gross-acre are predicated on the assumption that the average dwelling unit in an urban residential area would have at least four rooms and that the average family size would be 3.5 persons.

Minimum street space per family, to provide both for moving traffic and for parked vehicles, has been determined on the basis of sample studies made in residential neighborhoods of different sizes, with buildings of varying height and coverage. A further assumption is that up to 50 per cent of the private land not covered by buildings might be available for automobile parking but that only 20 per cent of the total street area could reasonably be set aside for this purpose. An allowance has been made on a per-family basis for neighborhood shopping facilities, although the area required is small and such facilities in central portions of cities might often be accommodated in the first floor of residential buildings.

Among the standards adopted for this study, probably the most controversial is that relating to parks, playgrounds, and other public open spaces. An allowance of

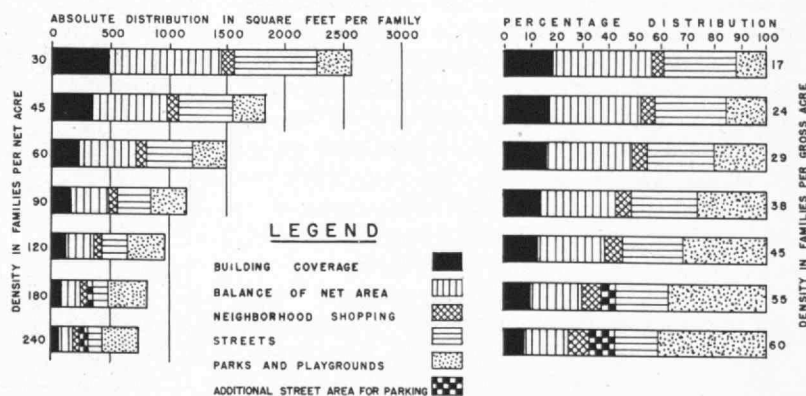
\* Presumably the English standard for low-rent housing — 12 units to the acre, including the area in streets as well as in house lots — would not be acceptable if applied to the central portions of our large American cities, although we have been told recently by Sir Ernest Simon that British authorities intend to hold to the 12-unit figure as the maximum density to be permitted in any circumstances in Great Britain's postwar housing program.

## DENSITY STANDARDS FOR MULTI-FAMILY RESIDENTIAL AREAS

## C H A R T III

REPRESENTATION OF TABLES III AND IV

## S P A T I A L   R E Q U I R E M E N T S   P E R   F A M I L Y





two acres per 1,000 persons may be considered by some too generous a recreational standard for application to existing urban areas with a high percentage of building density and a high unit land cost. However, there is more evidence to show that the standard is too low for general adoption than that it is not low enough, provided — and this fact is important — the hypothesis is accepted that residential areas with a high density per net acre should have at least as much public open space per capita as do similar areas of low density.

It is the writer's belief not only that this hypothesis is sound but that the public area per capita should be *increased* in proportion to any addition in net density, for under typical conditions an increase in the latter is always accompanied by a decrease in the per-capita amount of usable private land (that part of the net area not covered by buildings). For example, if a maximum of 35 per cent of the total net area is assumed to be usable for recreation, the area per family for such a purpose would decrease from about 500 square feet at a density of 30 families per acre to 65 square feet at a density of 240 families per acre (see Table 3). The actual result is to provide the less densely settled district with more acres of private land per 1,000 persons than are available to the more thickly populated district. The gross amount of private and public land for all types of recreation for the two areas would therefore be 5.5 acres and 2.5 acres per 1,000 persons, respectively.

On the basis of the foregoing figures, one would have good reason for maintaining that the minimum standard of public open area should range from 1.5 acres per 1,000 at net densities of 30 families per acre or less, up to 2.5 acres per 1,000 at net densities of 240 families per acre or more. This would result in a minimum over-all standard of about three acres of combined public and private recreational space per 1,000 persons for the whole range of densities. This figure, of course, would apply primarily to districts where the population characteristics are typical; the ratio of recreational area per capita would have to be adjusted for variations from the normal in percentage of child population and for the occupational and ethnic groups residing in a given district. In view of the fact that changes are likely to take place in population composition over a period of years, however, adoption of a minimum standard based on normal conditions would be much safer.

The tables and charts accompanying this article have been purposely designed so that they do not in themselves give minimum standards of density but permit such standards to be derived easily, once certain basic factors have been established or agreed upon. For instance, if for various reasons — social and economic — elevator apartment buildings were agreed to be unsuitable for families in the lower income groups, then the estimate of maximum density would be based on a maximum height of three or four stories. With a maximum building coverage of 30 (*Continued on page 384*)

TABLE 1

*Densities Per Net Acre in Relation to Height and Coverage of Buildings*

(a) Density in families per net acre	30	45	60	90	120	180	240
(b) Density in persons per net acre at 3.5 persons per family	105	158	210	315	420	630	840
(c) Net area of lot per family in square feet	1,450	970	725	485	360	240	180
(d) Gross floor area per family in square feet	800	800	800	840	940	940	940
(e) Ratio of average gross floor area to net area of lot; (d)/(c)	0.55	0.82	1.10	1.73	2.60	3.90	5.22
(f) Average height of buildings in stories, assuming average building coverage of approximately 30 per cent; 100(e)/30	2	3	4	6	9	13	17

TABLE 2

*Minimum Street and Parking Area per Room in Relation to Density per Net Acre*

(a) Density in families per net acre	30	45	60	90	120	180	240
(b) Average building coverage	30%	30%	30%	30%	30%	30%	30%
(c) Net area per family in square feet (From Table 1)	1,450	970	725	485	360	240	180
(d) Area of lot not covered by buildings; 70 per cent of (c)	1,015	680	508	340	252	168	126
(e) Average street area per family	700	480	380	280	220	150	120
(f) Available parking space per family; 50 per cent of (d) plus 20 per cent of (e)	648	436	330	226	170	114	87
(g) Area to be added to street area (e) in order to bring minimum parking space per family up to 160 square feet	0	0	0	0	0	46	73
(h) Total street area per family in square feet; (e) plus (g)	700	480	380	280	220	196	193

TABLE 3

*Maximum Density per Gross Acre Obtainable at Various Densities per Net Acre*

(a) Density in families per net acre	30	45	60	90	120	180	240
(b) Net area per family in square feet; item (c), Table 2	1,450	970	725	485	360	240	180
(c) Additional allowance for local shopping facilities	105	90	90	70	70	60	55
(d) Total net area	1,555	1,060	815	555	430	300	235
(e) Area of parks and playgrounds per family at 2 acres per 1,000 persons	305	305	305	305	305	305	305
(f) Total street area per family; item (h), Table 2	700	480	380	280	220	196	193
(g) Gross area per family in square feet; (c) plus (d) plus (e)	2,560	1,845	1,500	1,140	955	801	733
(h) Density in families per gross acre (approximate)	17	24	29	38	45	55	60

TABLE 4

*Proportionate Land Uses at Various Densities per Gross Acre (Derived from Table 3)*

Density in families per gross acre	17	24	29	38	45	55	60
Per cent of gross area in:							
Net area (Residential)	57.0	52.5	48.5	42.5	37.5	30.0	24.5
Commercial	4.0	5.0	6.0	6.0	7.5	7.5	7.5
Parks	12.0	16.5	20.5	27.0	32.0	38.0	41.5
Streets	27.0	26.0	25.0	24.5	23.0	24.5	26.5

# Research and Patents

## *Serious Detriment to Industry and to Society Would Result from Drastic Alteration of the American Patent System*

BY ROBERT E. WILSON

### PART II

**C**RITICS of the American patent system who urge drastic changes in it level their heaviest attack, as we have seen, on the licensing aspect of the system. Much argument holds that licensing should be made compulsory; much demands that restrictions on licenses be prohibited. In *The Review* for April, I discussed these contentions, both of which appear highly undesirable, the first largely because it cancels the very reward the inventor was supposed to receive — that of a limited monopoly upon his invention in return for his disclosure of it; the second because the net effect of forbidding restrictions in licenses is, from a practical point of view, quite likely to be the opposite of that intended.

Yet to condemn these drastic suggestions, as I think they should be condemned, does not mean that other ways of improvement do not exist. One abuse which has been clearly evident in a few patent cases in recent years is the practice of deliberately and excessively prolonging the period of argument back and forth in the Patent Office so that a patent is not issued until many years after the application, in order to get the benefit of a later effective period of life. For this reason, one of the suggested reforms which seems to me to have real merit

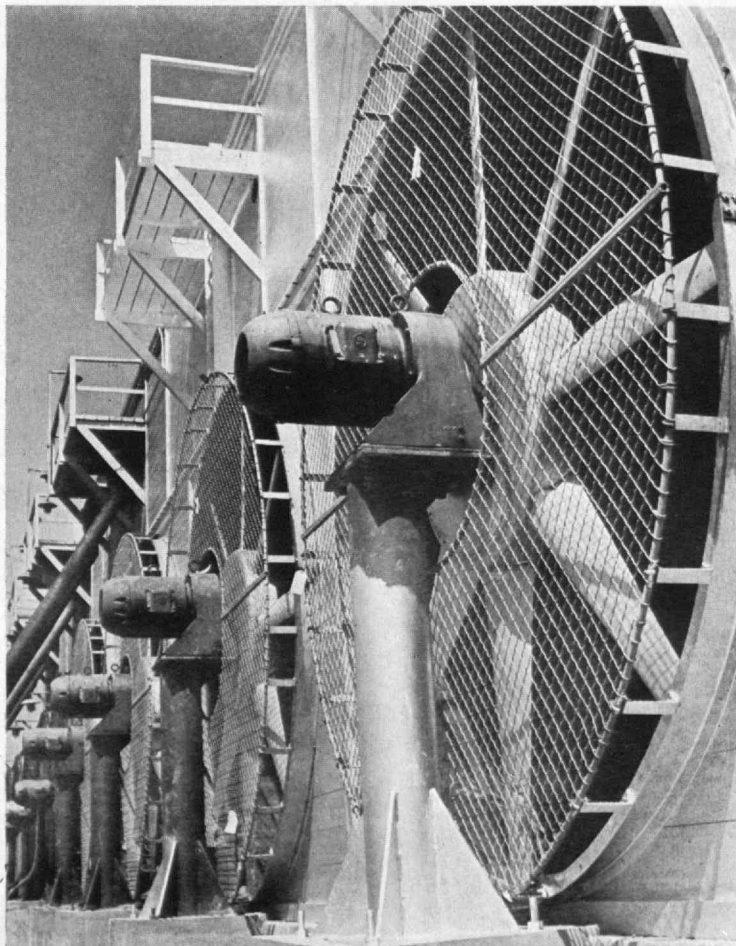
would keep the life of the patent at not more than 17 years but also limit the expiration date to be not more than 20 years after the application was filed. Even the 17-year life is open to question in view of the accelerated industrial tempo which, in general, makes it possible to get a new invention into operation much more promptly than when the 17-year term was originally set. On the other hand, to make and develop new inventions is getting more expensive and difficult as the frontiers of science are pushed farther afield; hence some offsetting increase in incentive is desirable. Seventeen years seem like a long period when we are in the midst of a new development, but they represent a short time in the life of a nation or an industry. Certainly no one today begrudges Bell his monopoly on the telephone from 1876 to 1893.

It must be conceded that a large number of patents issued by our Patent Office relate to petty details of routine improvement and do not cover true inventions. Despite the fact that these weak patents are being consistently knocked down by the courts, they are often a source of harassment, confusion, and expense. The Patent Office seems to me to have too low a standard of patent-ability and the courts in recent times too awesomely high a standard. Although the Patent Office is required to resolve its doubts in favor of the inventor, it seems in general to have been too liberal. The Patent Office is not alone at fault here, for it is subjected by attorneys and applicants to strong and relentless pressure to issue some kind of a patent even though the applicant or attorney realizes that the patent may be of doubtful validity. This type of patent is sometimes called an "insurance patent" because its main purpose is to prevent someone else from being granted a patent on the same thing later.

The character of patents probably would also be improved simply by a rise in the salary standards in the Patent Office. The present salary situation is such that the patent examiner has little incentive to regard service in the Patent Office as a lifetime career, with the result that that office functions to a considerable degree as a training school for patent attorneys. Improvement is likewise desirable in the information available to examiners in making searches for patentable novelty. Much practical knowledge and information from the industry should be, but is not, available in the Patent Office. One constructive move to help remedy this situation would be to establish a procedure whereby the examiners, at least those of senior rank, would have frequent personal contact with development and manufacturing in the fields which they are examining.

(371)

*Cooling tower at a sodium plant*



*Ron Partridge from Black Star*



For an authoritative and considered statement of the relation between patents and research, one would logically go to the National Research Council. In their December, 1940, report to the National Resources Planning Board, they have said: "It is generally recognized . . . that patents play an important part in the motivation of research, and no changes in the patent system should be made without most careful consideration of possible effects on the welfare of industrial research."

Emasculation of our patent system is bound to discourage much industrial research, which has grown so amazingly in recent years that it employed about 70,000 research workers in 1940. The effect on the amount of research done in any particular instance, however, will vary greatly with the industry and especially with the size of the company. The long-run effect of emasculation would seem to be in a direction that is socially undesirable, as the competitive position of the smaller companies will be weakened. Let us consider the relative effect on companies of various sizes.

A drastic weakening of our patent system will least affect the research policies of the large companies. In all their principal fields of activity they can readily afford to carry on research programs, solely for the purpose of maintaining their competitive position and keeping down their manufacturing costs. They regard royalties mainly as incidental by-products of their research, and their chief interest in patents is to help them secure maximum operating freedom by virtue of exchanges of licenses. Obviously, if such companies find it expedient not to depend on patents, they will not stop their research but will tend to keep their know-how largely to themselves.

The effect of emasculation of our patent system on the research activities of medium-sized and small companies will be much more severe. They must have some research organization if they are to keep anywhere near abreast of competition, but their laboratories cannot possibly do original research in all their fields of activity. They concentrate in general on their operating problems and the application of various patented processes to their own needs. In either type of work, they frequently run across some new ideas which seem to have merit; as long as they have the prospect of patent protection and substantial royalty income, they can and do exploit such ideas, at least through the phase of laboratory development, even though their own activities would not justify the cost of a thorough investigation. Many small laboratories have more than financed all their research activities by one or two important inventions. Also, when such companies reach the point of needing to undertake large-scale development — which in our industry frequently costs several hundred thousand or even a few million dollars — they can, by virtue of patent protection, usually interest other companies in joining with them and sharing the development costs. Several small companies in our industry have attained a position of pre-eminence in certain fields by just such methods. Without the incentive and protection of a sound patent system, however, the ideas would probably never have been developed. As Conway P. Coe, commissioner of patents, has said: "Speculative capital will not back new inventions without patent protection."

Moreover, without our patent and licensing system, the companies which develop major new processes would not be giving out information and trying to sell licenses. Hence the smaller companies would not be able to study promptly the application of new processes to their own needs, so that the whole process of development in industry would be retarded.

In addition to the research conducted by operating companies, many industries have one or more nonoperating companies which maintain programs of research and development that have resulted in important processes. Outstanding among these in the petroleum industry is the Universal Oil Products Company, which developed the Dubbs cracking process. For over 20 years this company has maintained a large research staff and has made many outstanding contributions to the refining of petroleum and to the chemical field as well. It has spent approximately \$25,000,000 for research and process development, more recently at the rate of about \$2,000,000 annually. The income of the company is derived entirely from the licensing of its patented processes, and the major portion of its royalty income has been used for the continuing of research and development. The income derived from royalties on thermal cracking was largely used to study and develop some of the present catalytic processes so vital in the war effort, including catalytic cracking, alkylation, isomerization and dehydrogenation for aviation gasoline, and other processes for the production of components of synthetic rubber, and so on. Universal Oil Products also maintains a group of skilled technicians who for years have advised and assisted its smaller refiner licensees to maintain their operations on the most efficient basis. The weakening of our patent system would automatically result in the disappearance of these research, development, and licensing companies, which have proved particularly important to the smaller operating companies.

A generation ago most research workers in the medical field and many of those working in our universities felt that the patenting of their discoveries was not quite ethical, especially in fields relating to public health. During the past 20 years, however, recognition of three facts has been growing: (1) Failure to patent is more likely to delay than to encourage the development and marketing of new products, particularly if any substantial investment or advertising is required to get them started. (2) Failure to patent leaves new remedies open to widespread abuse by unethical manufacturers and promoters, whereas patenting permits a control of quality and marketing practices which is highly desirable with many of the new drugs. (3) Failure to patent simply takes away a large potential income from those who benefit from new discoveries — income which might better be collected and used to promote further research in related fields. Growing appreciation of these three facts has largely changed the attitude of the workers in these fields, so that patenting is now the usual practice. Partly because of the outstanding example of the Wisconsin Alumni Research Foundation, millions of dollars a year in royalties obtained from the inventions of earlier workers are today being devoted to pure research in medical and other lines, generally in the same organizations. This sound and socially (Continued on page 394)

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# THE INSTITUTE GAZETTE

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PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

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## Killian Named Executive Vice-president

*The Review's Former Editor, Executive Assistant to President Compton Since 1939, Assumes New Office on July 1*

THE appointment of James R. Killian, Jr., '26, as executive vice-president of the Institute was announced by President Compton on April 16. Mr. Killian has been executive assistant to Dr. Compton since January, 1939, and his new appointment becomes effective on July 1.

In making the announcement, President Compton said: "The war has multiplied by several times the amount of the Institute's activities and has also complicated all operating details. Mr. Killian has shown fine executive capacity in dealing with such matters. He furthermore knows intimately our internal affairs and our alumni organization, and has the confidence of all his associates to an extraordinary degree. As executive vice-president, Mr. Killian will continue to work for the prompt and efficient execution of the business coming to the President's Office and will handle certain coordinating responsibilities."

Before joining the staff of the President in 1939, Mr. Killian had been associated for 13 years with the publication of *The Review*, of which he became editor in 1930. He is widely known among the Alumni, is a former treasurer of the Alumni Association, and is chairman of the Advisory Council on Undergraduate Publications. His administrative duties include the chairmanship of the Board of Publications of the Technology Press.

Mr. Killian is a member of the American Association for the Advancement of Science and the Society for the Promotion of Engineering Education. He is a member of the St. Botolph Club of Boston, and his fraternity is Sigma Chi. He was born in Blacksburg, S. C., in 1904, the son of James R. and Jeannette Rhyne Killian. He studied for several years at Duke University before coming to Technology, where he was awarded the degree of bachelor of science.

### Faculty Changes

PROMOTIONS on the Faculty of the Institute for the next academic year, effective July 1, include three advancements to the rank of professor: Douglass V. Brown, Department of Economics and Social Science; Frederick H. Norton, '18, Department of Metallurgy; and John B. Wilbur, '26, Department of Civil and Sanitary Engineering.

Promoted to the rank of associate professor are Robert H. Cameron, Department of Mathematics; Harold W. Fairbairn and Robert R. Shrock, Department of Ge-



James R. Killian, Jr., '26

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ology; Ernest N. Gelotte, '23, School of Architecture; Bernard S. Gould, '32, Department of Biology and Biological Engineering; George G. Harvey, Department of Physics; Walter McKay, '34, and Manfred Rauscher, '26, Department of Aeronautical Engineering; and Herman P. Meissner, '29, Department of Chemical Engineering.

Members of the staff advanced to the grade of assistant professor are Douglas P. Adams, Section of Graphics; Joseph Bicknell, '34, Department of Aeronautical Engineering; Paul M. Chalmers and John B. Rae, Department of English and History; Kenneth R. Fox, '40, Department of Mechanical Engineering; Thomas R. P. Gibb, Jr., '40, and Walter H. Stockmayer, '35, Department of Chemistry; Albert C. Hall, '37, Department of Electrical Engineering; Irving Knickerbocker, '24, Department of Economics and Social Science; Thomas F. Malone, Department of Meteorology; and P. Charles Stein, '40, Department of Civil and Sanitary Engineering.

Promotions to the grade of instructor include those of Donald P. Campbell, Roberto M. Fano, '41, Robert C. Habich, Walter K. Halstead, '39, William L. Root, and James N. Thurston, all of the Department of Elec-



trical Engineering; Pei-Moo Ku, '42, Department of Aeronautical Engineering; and Charles F. Peck, Jr., '41, Department of Civil and Sanitary Engineering.

Members of the Faculty who will retire on July 1 are Professor Harry W. Gardner, '94, of the School of Architecture; Professor George E. Russell, '00, of the Department of Civil and Sanitary Engineering, who has been appointed a lecturer for the next academic year; and Professor Miles S. Sherrill, '99, of the Department of Chemistry.

Professor Gardner joined the staff of the Institute in 1895, the year after his graduation. He has served without interruption since his original appointment. Professor Russell joined the staff immediately after receiving his degree in 1900. Widely known in engineering circles, he has held many public appointments and served on various engineering commissions. Professor Sherrill became a member of the staff in the year of his graduation and has been one of the Institute's distinguished teachers in the field of chemistry.

### *The Council Meets*

**M**EETING at the University Club in Boston, since Walker is not available at present because of wartime necessities, the Alumni Council held its 231st session on the last Monday in March, under the chairmanship of Vice-president Harold Bugbee, '20, who acted in the absence of President Francis A. Barrett, '24. The meeting was well attended.

Aspects of the way in which the war has affected programs at the Institute, with particular emphasis on undergraduate affairs, were presented by the three speakers: John D. Mitsch, '20, Associate Professor of Structural Engineering, who is armed services representative at Technology; Joseph C. MacKinnon, '13, registrar; and James R. Killian, Jr., '26, executive assistant to President Compton. Professor Mitsch reviewed the frequently changing situation of enlistments and deferments of undergraduate students, bringing the story down to the present time and outlining the details of the Navy V-12 plan and the Army Specialized Training Program as they are now constituted. Mr. MacKinnon discussed enrollment at the Institute, showing by means of detailed figures the gradual change from a student body consisting largely of civilians to one in which Army and Navy students will be the larger group.

Mr. Killian related some of the financial and administrative problems involved in the meeting of these wartime requirements. Describing the man-power situation, particularly as it has to do with men of college age, he outlined the effect of the Army and Navy programs in markedly reducing the number of civilian students available to the many colleges in the country. He sketched the contractual basis on which the Institute will conduct scientific and engineering courses for the Army and Navy and will continue its research for government and industry, and described various individual problems encountered as a result of the necessity for rearrangement of space, reassignment of staff, and accommodations for housing and feeding the larger Institute population.

Business of the meeting, in addition to routine reports, included recommendation by the nominating committee on advisory councils, presented by A. Warren Norton, '21, that the present membership of the advisory groups be continued in office for indefinite terms in order that unpredictable needs may be best met. Re-establishment of the definite terms of office will be brought up for consideration after the wartime dislocations have terminated, according to the recommendation of the committee, which was passed.

Resolutions in memory of Charles T. Main, '76, were presented by Walter Humphreys, '97, chairman of a committee including Henry E. Worcester, '97, and William M. Bassett, '02. C. Yardley Chittick, '22, chairman, spoke for a committee comprising Winthrop Cole, '87, and Richard Whiting, '26, in presenting resolutions in memory of Giles Taintor, '87. A silent rising tribute adopted the resolutions of each committee.

### *Visiting Committee Report*

**T**HE Committee on the Department of Business and Engineering Administration\* met on December 11. Robert G. Caldwell, Dean of Humanities; Professor Erwin H. Schell, '12, Head of the Department; and James R. Killian, Jr., '26, executive assistant to President Compton, also were present. Members of the staff of the Department and three representative students attended portions of the meeting.

Professor Schell reported on activities of the Department and on action taken since the meeting of the Committee in April, 1942. Analyses presented showed that, with 177 students as of November 2, the Department shared with the Department of Naval Architecture and Marine Engineering the fourth place in the number of students enrolled in the various Departments of the Institute. Many of the special courses in the Department's curriculum are given by the Department of Economics and Social Science, and the engineering subjects are within other Courses. The total of 11 professors and instructors, therefore, is one of the smallest of any of the Departments.

In so far as present uncertainties permit, provision is being made for adjustment to enrollment and other changes necessitated by the emergency. The smallness of the Faculty group reduces the severity of the adjustment, and the Department believes that the plans are adequate for the immediate future at least.

The *Handbook of War Production*, written by Edwin A. Boyan, '36, formerly of the Department, and published by McGraw-Hill, was reported a success, with a second printing already authorized. Another book is planned, to be based on studies now being made. Several theses directed by William Van Alan Clark, Jr., '42, formerly a research assistant in the Department, covered various aspects of serialized production. These studies disclosed problems which will provide a foundation for constructive publications in the Department's series of books. A series of such publications is considered

\* Members of the Committee for 1942-1943 are Edward P. Brooks, '17, Chairman, Frank W. Lovejoy, '94, Raymond Stevens, '17, Frederick S. Blackall, Jr., '22, Carl T. Keller, Edward R. Stettinius, Jr., and Roy A. Young.

by Professor Schell a significant part of the over-all activity of the Department.

A chart of placement tabulation was presented at the meeting. This showed a steady increase in the percentage of the Department's graduates now in the Army and Navy — from the first Class of 1917 to the Class of 1942, of whom 70 per cent are in some sort of war service.

Interest was shown in a request from the Puerto Rico Development Company for the training of a group of Puerto Rican engineering graduates for a place in the operation of new industries contemplated for that territory. The plan presented for the company's consideration provides for a procedure much like that previously established by the Department for the Sloan fellowship groups. [This plan has subsequently been accepted.]

Special consideration is now being given by the Department to the subject of new-product control. This is leading to a postwar course, and preliminary steps have already been initiated. Working with Professor Schell on the formulation of a special course or group of courses in this subject are Ross M. Cunningham, Assistant Professor of Marketing; Ronald H. Robnett, Associate Professor of Accounting; and Gerald B. Tallman, Assistant Professor of Marketing. Studies are being made of the plans and practices in industry for provisions for this management function.

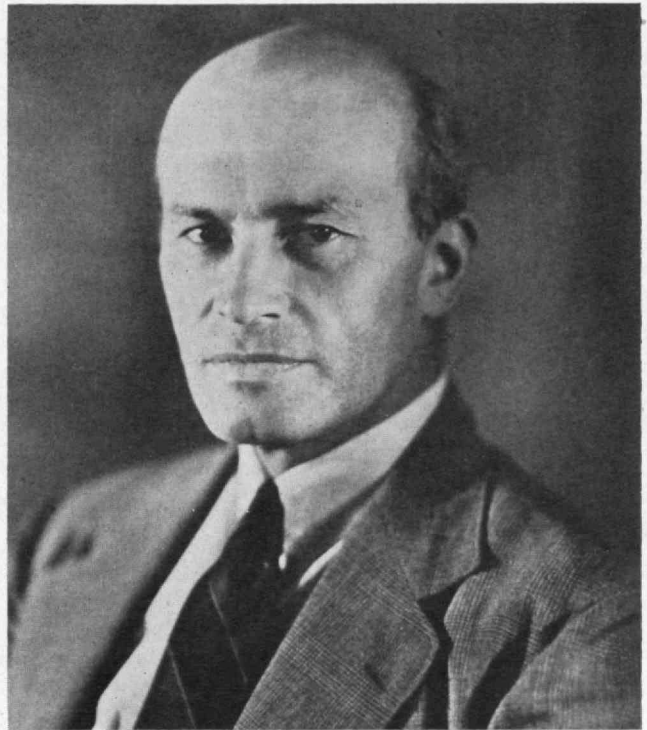
The Committee were impressed with the character and range of material contained in the theses of the Department's undergraduate students, particularly by several major studies which have been made in comparatively recent years. The Committee believe that serious consideration should be given to the possibility of publishing material drawn from these theses as an addition to previous publication practice.

### *Appointed*

**THEODORE B. PARKER, '11**, chief engineer of the Tennessee Valley Authority, will become head of the Department of Civil and Sanitary Engineering on July 1, President Compton announced last month. Mr. Parker will succeed Professor Charles B. Breed, '97, Head of the Department since 1934, who asked to be relieved of his administrative duties to devote full time to his continuing post as professor of civil engineering.

Mr. Parker's distinguished engineering career with the Tennessee Valley Authority began in 1935, when he was appointed chief construction engineer. Under his direction the huge Norris and Wheeler dams were completed, and he had charge of the design and construction of all subsequent dams up to the present time. This great engineering undertaking includes six additional dams on the Tennessee River and eight major developments on tributary streams. His appointment as chief engineer was made in 1938.

Immediately following his graduation from the Institute in 1911, Mr. Parker was an assistant in the Department of Civil Engineering for one year, leaving to join the staff of H. C. Keith, consulting engineer of New York, with whom he served as a draftsman and computer on highway bridge design. From 1912 to 1917 he was assistant hydraulic engineer of the Utah Power and Light Company at Salt Lake City, and from December,



*Theodore B. Parker, '11*

1917, to March, 1919, he served in the World War as first lieutenant and later captain, commanding Company D of the 26th Engineers in service overseas. Upon his return to civilian life, Mr. Parker joined the engineering staff of the Electric Bond and Share Company of New York, with which he held the post of assistant hydraulic engineer. He served from September, 1920, to November, 1922, with the United States Army as captain in the Corps of Engineers, the period including one year of duty with troops and a year at the Army Engineer School, from which he was graduated in 1922.

Mr. Parker held the position of hydraulic engineer with the Stone and Webster Engineering Corporation of Boston from 1922 to 1933, designing various hydroelectric developments, including Bartletts Ferry near Columbus, Ga., and the Rock Island development on the Columbia River in Washington. For four months beginning in March, 1933, he attended the United States Army Command and General Staff School at Fort Leavenworth, where he was commissioned a lieutenant colonel in the Corps of Engineers Reserve, a post from which he later resigned. From August, 1933, to November, 1935, he was on the engineering staff of the Federal Emergency Administration of Public Works, serving successively as engineer examiner, state engineer, and acting state director for Massachusetts.

A native of Roxbury, Mass., Mr. Parker is the son of Franklin Wells and Sarah Bissell Parker. In 1913 he married Miss Estelle Peabody of Wellesley. Their son, Franklin P. Parker, was graduated from Technology in 1936 and is now a captain in the Corps of Engineers of the United States Army. Their daughter, Nancy, is a student at Wellesley College.

Mr. Parker is a member of the American Society of Civil Engineers and a director of the Society of American Military Engineers.



## CINDERELLA STARCH

(Continued from page 365)

some of their attachments to neighbors, as is illustrated in Fig. 3. The result is a striking decrease in chain length, accompanied by considerable thickening. When many chains behave thus in concert, their radial orientation in the granule results in an increase in the area of each concentric layer of the granule. Since the close packing of chains does not allow the radius of the granule to shrink at the same time, the chains pull away from the center to form a cavity.

Actual formation of little evacuated spaces in the center can be demonstrated under appropriate conditions, but in most instances water filters in fast enough through the expanding layers to fill up the vacuum which "Nature abhors" so much. As the water passes through the expanding layers, it dissolves the soluble fractions of the starch, so that when all expansion has ceased a thin wall remains, made of whatever granule material has been undispersed by the water. This wall encloses a body of starch solution, and solution plus resistant wall forms the balloonlike granule of the starch jelly.

At this point it becomes clear for the first time in the present discussion that our Cinderella is not one individual but in reality twins. The existence of two kinds of starch has long been suspected, but recent experiments have succeeded in clarifying the situation considerably. One fraction of the starch, identified by the chemists as "amylose," is that which dissolves in the water during gelatinization, occupying the central cavity and then slowly being lost through the pores of the sack wall into the external solution. The other component is called "amylopectin" and comprises much of the material remaining as the sack wall.

Since they are similar substances, the chemist experiences trouble in thoroughly purifying one starch component of its slightly different companion. The difficultly dispersed molecules may be dragged into solution by several of their soluble relatives, or a soluble one may be trapped in a tangle of resistant molecules. With starch, the problems of separation are even greater than with many other substances, for under proper conditions both amylose and amylopectin are dispersible. Actually, when once "dissolved," amylopectin is more stable in solution than is amylose, and *very pure* amylose often resists solution more than does amylopectin. In the past, this situation has caused much confusion among chemists.

Because of such difficulties, the importance of three different fairly successful methods recently developed for the separation of amylose and amylopectin should not be overlooked. One method simply leaches the amylose solution gently from suspensions of gelatinized granules. Another takes advantage of the observation that ordinary cotton batting placed in a starch solution will, by absorption, preferentially remove the amylose molecules, leaving behind the amylopectin ones. A third investigator has found that when certain higher alcohols, primarily butyl alcohol, are added to starch suspensions, they cause a preponderant precipitation of the amylose.

With the availability of reasonably pure starch fractions has come better characterization of them. The amylose molecule seems most like cellulose in being a linear array of dextrose units; amylopectin has a branched structure, with a treelike ramification of constituent straight-chain segments (Fig. 4). Amylose molecules, which have molecular weights of 13,000 to 60,000, are relatively the smaller, consisting of about 80 to 350 dextrose units arranged to form the single straight chain. Amylopectin molecules may have molecular weights of about 50,000 to 1,000,000, so that 300 to 6,000 dextrose elements compose the molecule, with average straight branches of about 30 dextrose units each. Granules from different sources possess varying proportions of the two components, but commonly about three-fourths of the starch is amylopectin.

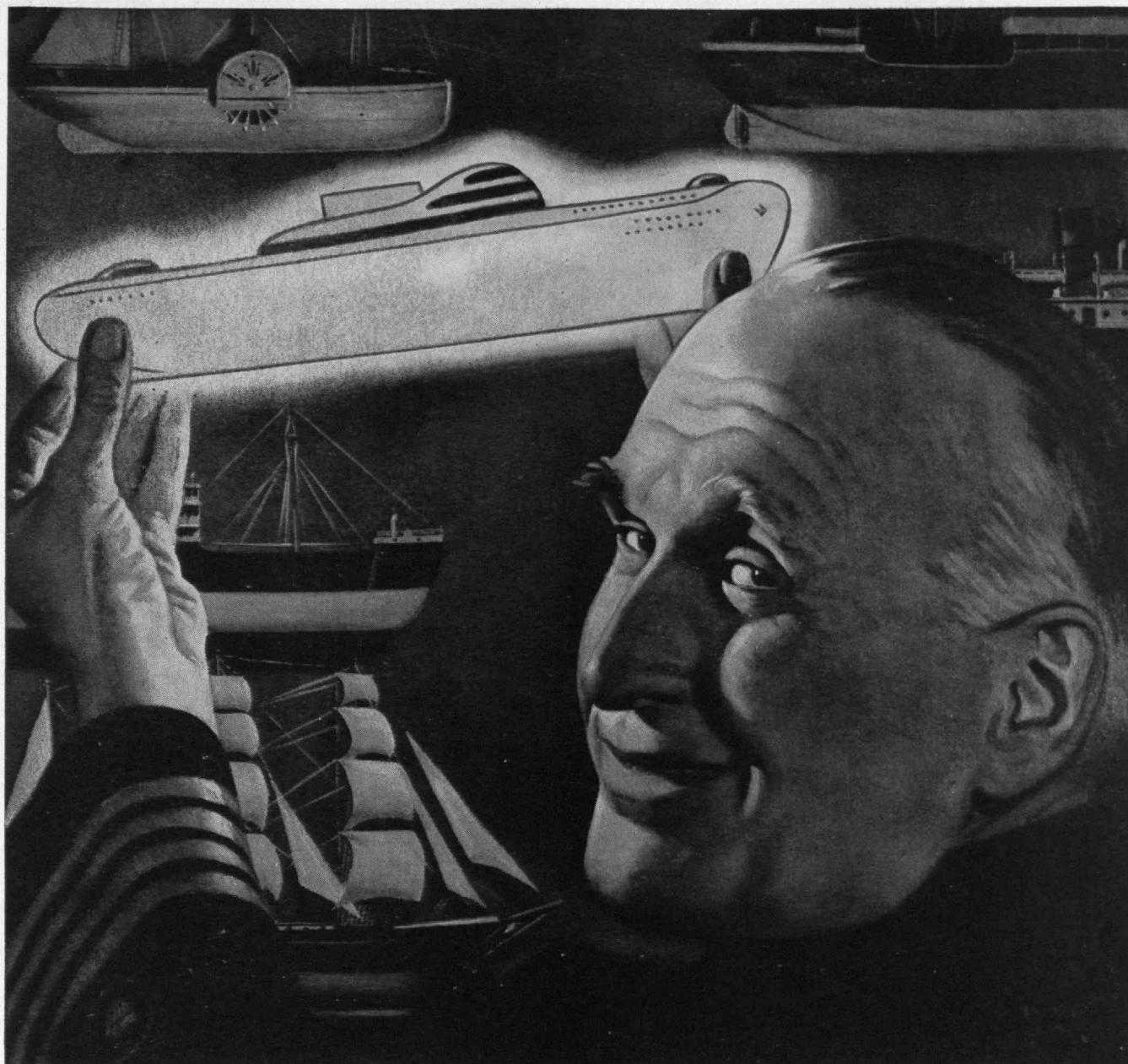
With this explanation of the two types of starch molecule, some of the major difficulties in the understanding of this carbohydrate become cleared up. The amylopectin molecule differs chemically from amylose chiefly in the possession of about 3 per cent of the dextrose elements at which branching occurs. Chemically it is difficult to pick out this small proportion and distinguish it from the similar one which constitutes the straight chains, yet the branches result in profound alterations in molecular properties. Some of the differences between the starch twins will become apparent in what follows.

**I**N the description of the "self-inflation" of starch balloons, the phenomenon was ascribed to certain contractile tendencies of starch molecular chains. While definite knowledge of the precise contracted form is lacking at present and must be left for the future to decide, nevertheless one is tempted to follow the lead of certain investigators in describing "molecular springs" of helical configuration.

Perhaps the best reasons for thinking in terms of helices come from considerations involving certain dextrans, smaller molecules split off from starch by the action of an enzyme obtained from the *Bacillus macerans*. These Schardinger dextrans, named after their discoverer, have been shown by standard chemical methods to be ring-shaped molecules in which dextrose units follow each other, bridged by oxygen atoms as in starch but differing from starch in that the "head" of each chain catches hold of its corresponding "tail" to form a closed cycle (Fig. 5a). Early estimates placed upwards of five units per cycle in molecules of the several dextrans of this type found.

One of the most interesting of the Schardinger dextrans — originally called the "a form" but recently, upon x-ray proof that its molecule contains six glucose residues, renamed the "cyclo-hexa-amylose" — crystallizes as beautiful hexagonal plates. More interestingly, it also forms hexagonal blue prisms when iodine is present. The blue iodine color of these prisms is similar to that known far and wide by chemists as typical of the starch-iodine absorption complex, used by investigators as a sensitive color test for starch or for iodine. Ordinary linear dextrin molecules of the same size, in which heads have *not* been joined to tails, do not show iodine coloration.

(Continued on page 380)



## **Ships, too, are here to stay**

**N**EVER before has so great a flood of materials poured from the doors of industry and into the holds of ships. The end of the war, far from cutting off this flood, will merely change its nature from munitions to merchandise.

Shipping will be as vital in winning the peace as it is in winning the war. But old cargo carriers will not long be adequate to maintain the pace of tomorrow's global trade. Into their midst are sure to come new speedsters for ocean express—light-footed craft with structural parts of strong, corrosion-resistant alloys.

Exactly what they will look like, only naval architects might now dare to pre-

dict. But it is certain that, in addition to the standard marine metals, a host of new materials will present claims for a part in the construction of these ships. Where and how can each serve the shipbuilder best? Which will be most economical, efficient, enduring, for what purpose?

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is pioneering in the production of entirely new alloys that can cut manufacturing costs for many industries.

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The answer was found in fastening the group together by means of silver chains and other conductive materials. Connected into the circuit, a device consisting of high resistances prevents the formation of a static charge of any important degree of intensity.

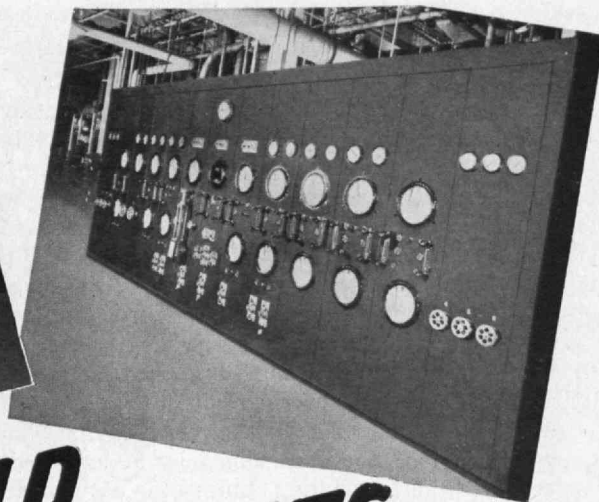
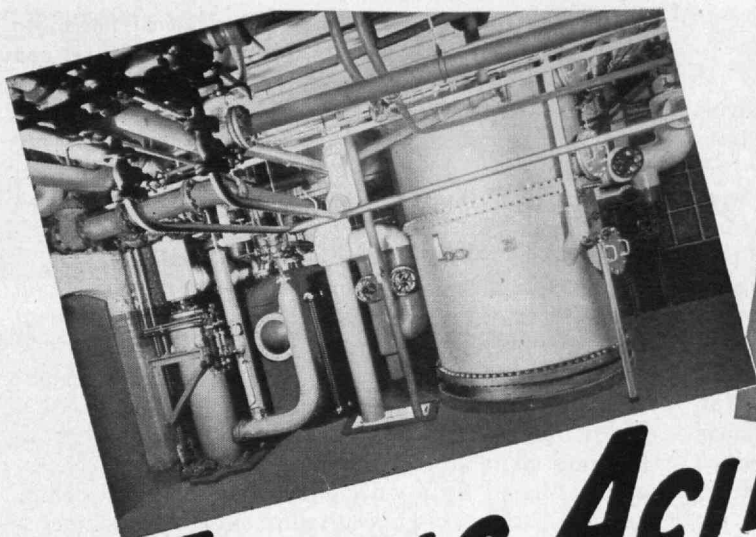
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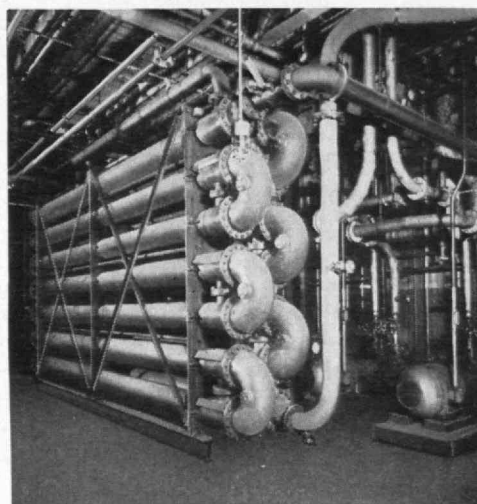
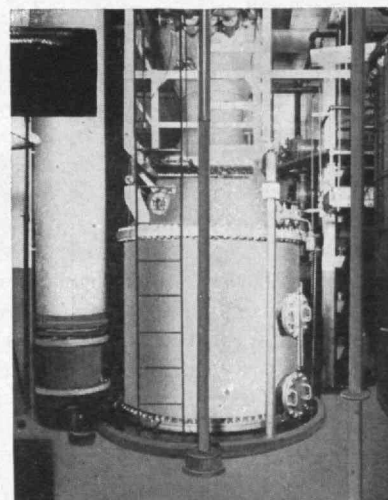
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## CINDERELLA STARCH

(Continued from page 376)

The cyclo-hexa-amylose, and the Schardinger dextrans collectively, are obtained in such large yields from starch that many have wondered whether some predisposition toward formation of the cyclic dextrans were not expressed in the configuration of starch molecules. This thought naturally leads to the suggestion that perhaps the function of the enzyme is simply to break off loops of starch molecular springs and tie the broken ends together to form the ring-shaped dextrans (see Fig. 5). As a consequence, the short-branched amylopectin molecules should be less suitable for the action of the Schardinger enzyme than are the relatively long linear arrays of amylose, for branching may be expected to interfere with perfect coiling. Indeed the amylose fraction has recently been found particularly suitable for Schardinger dextrin formation.

The scientist seeking to confirm or investigate the details is handicapped now when he tries to see these extremely small, coiled molecules. He can only infer their presence, but the hypothesis of helical molecules offers considerable illumination to what have hitherto been puzzling starch phenomena. For example, within the amylose coils is room for iodine molecules. Placed in this position, the iodine is shielded from the water molecules of the starch solution. Normally, iodine in water solution is brown. The shielding results in the typical, starch-iodine blue color, more like that of iodine vapor, in which iodine molecules are essentially unaffected by their environment. Again, amylose shows blue iodine colors, whereas amylopectin iodine colors are reddish to red-brown, consequences of the relative perfection of coiling and shielding in the two starch fractions.

In the x-ray diffraction apparatus, the scientist does have a sort of eye with which to view the contortions of molecules. Unfortunately, the coils described above exist in water solutions or suspensions. When one attempts to look into them with the x-ray eye, one sees preponderantly the water molecules, which obscure the starch helices. Various alcohols and other organic substances, however, can precipitate the starch; if the task is done properly, it results in crystalline precipitates containing the starch and looking under the microscope like tiny dumbbells or six-petaled flowers. These precipitates give x-ray diffraction patterns of a distinctive type, which resemble patterns of precipitated starch iodide and probably also those of Schardinger dextrans. Thus, once again evidence points to a connection between starch in solution, the starch-iodine complex, and the configuration of the Schardinger dextrans.

The underlying basis of these relations would seem to be the coiled configuration, but the complexities of the interpretation of the diffraction patterns do not permit conclusive proof of this fact as yet. It can be said, however, that if we imagine that the alcohol molecules, like the iodine ones, are absorbed within starch helices, or that the helices are formed by the wrapping of starch chains about the alcohol molecules, some aspects of these patterns become understandable. The method for the fractionation of starch with butyl alcohol, mentioned earlier, probably owes its success to the

fact that the coiled molecules of amylose can pack into a crystalline precipitate with more facility than can branched amylopectin ones.

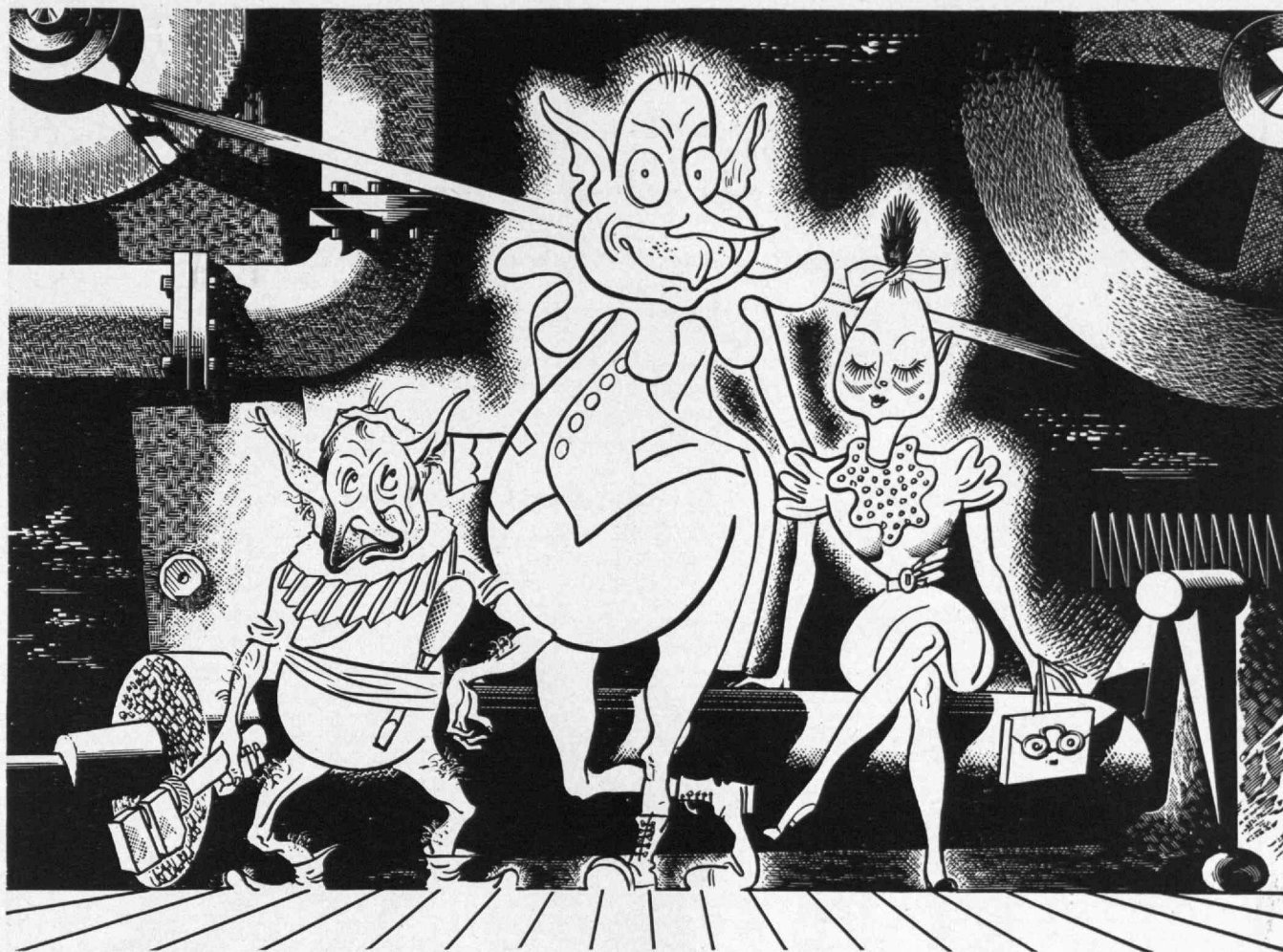
The coiled molecular chains of freshly prepared solutions undergo changes on standing; these changes are usually described as "aging" or "retrogradation." In time, much of the starch precipitates out, and here too the x-ray diffraction method helps to identify the crystalline modification that is produced. It is the same as is in evidence in starch granules, and the interpretation would be that during retrogradation the coils re-extend to a more nearly straight configuration characteristic of their original condition in the granule. Once the high-temperature conditions originally causing gelatinization or coil formation are gone, as on cooling, the coiled form becomes unstable and slowly changes back to the extended shape. Again, straightened linear molecules of amylose find it easier to crystallize out in a regular manner than do branched amylopectin ones, so that retrogradation, as evidenced by actual precipitation, is a characteristic of amylose alone. Pure amylopectin solutions remain for long times without decrease in stability.

WHAT has been said is sufficient to indicate the contortions that starch molecules seem to undergo, and to make clear why a knowledge of these contortions for both starch fractions is necessary if one is to proceed intelligently to increase the industrial utilization of starch. Amylose and amylopectin both differ so markedly in configuration, in molecular size, and in such properties as solubility and iodine coloration that the uses to which they may be put will probably be quite different. Also, when working with either, one will want to realize that the chemical reactivity and physical properties may change with the coiling or uncoiling of the molecular chains.

From the purely scientific view, the recent developments in starch chemistry are likewise of considerable interest. Starch is not alone among natural polymers in its manifestation of both contracted and extended chain forms. Many proteins — for example, those of relatively inert animal tissues, such as the keratin of hair or the collagen of tendons — also show phenomena of contraction and extension. The ability of muscle protein (myosin) to contract and lengthen is one case where this property has been put to practical use by animals. Even reactions inside all individual living plant and animal cells — notably the changes in configuration undergone in cell division by the genetic determiners, which are known to be composed of a type of protein — may be a manifestation of extensible molecular characteristics. The extensibility of natural rubber has long suggested elastic molecules. Increase of knowledge regarding the coiling and uncoiling of starch chains will be of value in providing biochemists with a relatively simple example of this important phenomenon.

Starch occupies at least one unique spot among the natural long-chain molecules: It is the only one which to date has been synthesized in the test tube. To be sure, this synthesis is done with the help of biological aids, a class of enzymes called phosphorylases, but the unique position is not materially damaged thereby. Phosphoryl-

(Concluded on page 384)



## THEM!

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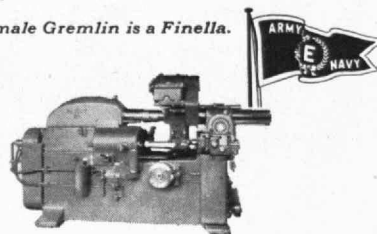
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## CINDERELLA STARCH

*(Concluded from page 380)*

ases extracted from both animal and plant sources can, in a matter of minutes and in good yield, build large starch molecules from a simple phosphate of dextrose. Some of the enzymes form typical plant starches, or more strictly the amylose fraction, identical with natural amylose in respect to x-ray patterns, blue iodine color, and ready retrogradability. On the other hand, they may produce a glycogen ("animal" starch), which seems to be an exaggerated form of amylopectin, at least as regards extreme frequency of branching, short-chain length, red-brown iodine color, and stability of its water solutions. Thus we can look forward to the time when, for laboratory purposes at least, the scientist will be able to construct at will any type of starch molecule he may desire, without reliance on the products of nature.

All in all, the Cinderella starch twins seem not to have been strangers to the whirl of the scientific ball, and in time industrial princes may be expected to seek them out to try upon them the glass slippers of increased chemical application.

## SHALL WE RATION CROWDING?

*(Continued from page 370)*

per cent for four-story buildings and 40 per cent for three-story buildings, our top limit of density would be 30 families, or approximately 100 persons, per gross

acre (see Charts I and II). This figure compares with existing gross densities of 300 persons an acre for Parkchester and 600 persons an acre for Knickerbocker Village, two privately constructed, large-scale projects in New York City.

Similar standards could be computed for medium- and high-rent housing on the basis of predetermined coverage and height maxima. It should be understood that standards derived from the accompanying tables are based on an assumption of maximum efficiency in the design of the neighborhood plan and of the individual structures. Where the rehabilitation program for an existing residential area calls for substantial reclamation or repair of the buildings themselves and a retention of a major portion of the area at present devoted to streets, a lower figure for maximum gross density would have to be adopted.

What are the economic implications of the adoption of a density ceiling of 30 families per gross acre to be applied to all housing or redevelopment projects for urban areas regardless of land-acquisition costs? Such a gross density would permit an average net density of not over 65 families per acre, which means that at least approximately 670 square feet of net building land would have to be provided for each family accommodated in the project. In a privately built apartment project, in which the average rent was between \$12.50 and \$15.00 per room per month, it is unlikely that the developers could set aside more than \$5,000 for the gross cost of each dwelling unit, assuming four-room apartments. Of

*(Concluded on page 386)*

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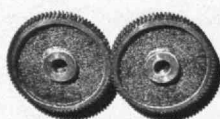
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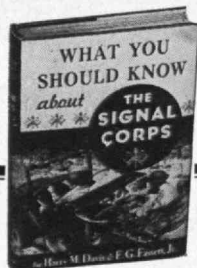
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## SHALL WE RATION CROWDING?

(Concluded from page 384)

this amount, at least 80 per cent and possibly 90 would have to go for construction and development costs other than land, leaving only \$500 to \$1,000 for the latter item. In other words, the maximum price which the developers could pay for the land would be between 75¢ and \$1.50 per square foot, depending on the unit cost of construction.

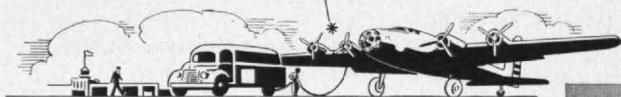
The example given above is intended only to be suggestive, but it has some interesting implications. It indicates that the values now placed on property in urban blighted areas are so high as to preclude private redevelopment without subsidy, whether such subsidy is in the form of capital grants or tax remission. Also it suggests that where prevailing land values do not exceed \$1.50 a square foot, a density ceiling of 30 families per gross acre might be entirely practical under present conditions and that on 50¢ land the density could be restricted to one-third the above figure without hardship to property owners. It is not unreasonable to expect that some recognition of this point of view should find its way into zoning-law revisions which are now taking place or are under consideration.

If the approach suggested here has any validity, the same general procedure could be used in determining ceilings on the intensity of use for application to commercial and industrial areas. While adherence to carefully worked out quantitative standards will not itself insure the adoption by cities of desirable land-use patterns, at least such adherence would encourage sounder and more flexible programs of reconstruction and would help us to avoid in the future some of the worst evils to which we have been committed by unrestrained development.

This article, of course, is concerned only with the possibility of establishing over-all standards of *maximum* population density to meet the worst conditions of land crowding (e.g., where it is necessary or desirable to house in an existing residential area as many as possible of the present inhabitants). In general, the *optimum* density will probably be considerably less than the figure of 30 families per gross acre, and in the older cities the social implications may prove to be more important than the economic when the establishment of long-range development programs for these residential areas is undertaken.

The Boston *Globe*, in a recent editorial discussing post-war housing trends, put the matter mildly when it said that "it would seem that many people will desire to live where there is more land. Here is a problem that city management should consider. It will be awkward if there is much migration from the cities. Therefore it is indicated that living in a city should be made as attractive as possible." Not only are our living habits and the desires of our people clearly changing in favor of more spacious surroundings (if they were ever in favor of congestion!) but our technical improvements in transportation and housing construction increasingly tend to encourage the dispersion of population over larger areas. These factors should give our city fathers some pause for thought.

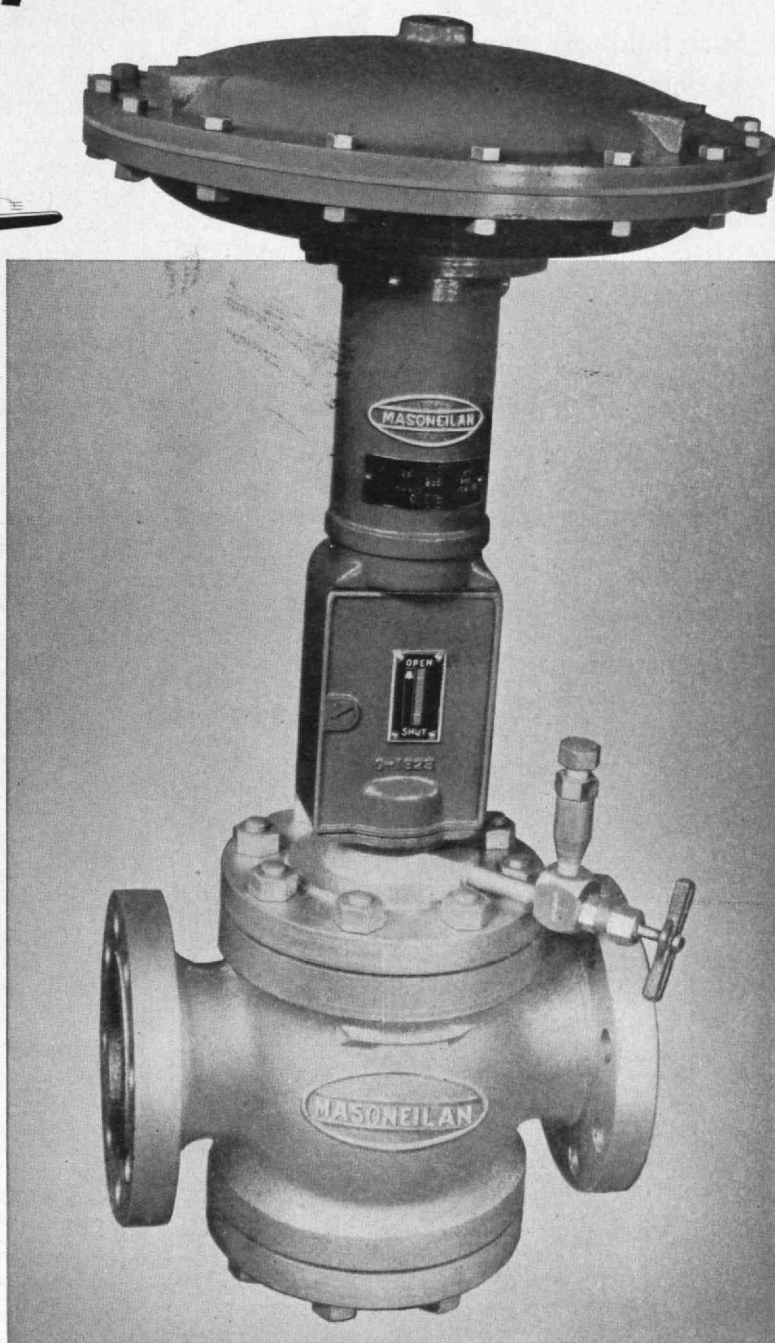
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## SCIENCE AND SOCIETY IN THE POSTWAR WORLD

(Continued from page 367)

still. (And from this fact will flow many a headache for college presidents!) The exceptional men who lead the competing teams must have adequate resources.

How is all this to be arranged? In part the answer turns on social, political, and economic factors which lie beyond the province of my remarks. It does seem clear, however, that certain prerequisites can be outlined—assuming, that is, that we desire a maximum development of the natural sciences and a maximum application of their results to the production of those things which civilization can employ.

At the base must be a truly universal system of education which enables the gifted boy or girl to complete the long process of scientific education without regard to the accidents of geography or birth. Then there must be in every field at least several equally strong and able groups of scientists or development engineers. For in no field should one organization be allowed to dominate the research or development activities, be that organization a government agency, a commercial company, or a research institute. The competing groups should be small enough to be flexible but large enough to be powerful. And their organization should be such that young men can operate effectively while they are still young. The dead hand of the past must not dominate the scene. Ideally, one would like to see each research group dissipated at least every 20 years, and a new one under a new frame of reference take its place. For one of the urgent problems is to keep a continuing flow of well-trained, talented youth going from our universities and technical schools into organizations where they can rapidly show their worth. Tradition and continuity are of the utmost importance in many affairs of man, but not in the field of research or the development of new industrial methods or machines. We all admire Russia today, not only for her incredible courage and fighting spirit but because of her success in applied science and technology. But I suggest we must remember that one of the key factors contributing to that success is that throughout Russia every part of her organization of science and technology is new and almost without exception manned by young men and women.

There is a great deal of talk about the proper organization of a research institute, or a research laboratory, or a development division of an industry. Undoubtedly there are types of organizations which are better than others. But give me the worst organization and let me build it afresh with young men, and I would guarantee that it will soon outstrip a better-organized group grown old in service and touched by the paralysis of age.

Competing groups of exceptional men, always flexible and mobile so that those outstanding in each generation can rise quickly to the top—that is the ideal arrangement for pure or applied science. One thing more is required. There must be an interchange of ideas and new discoveries. The interchange must be rapid enough to allow the work of one group to influence the other, but not under conditions which prevent the organizations

(Continued on page 390)

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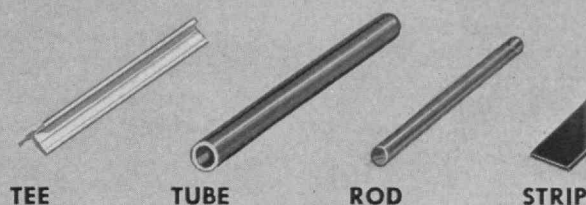


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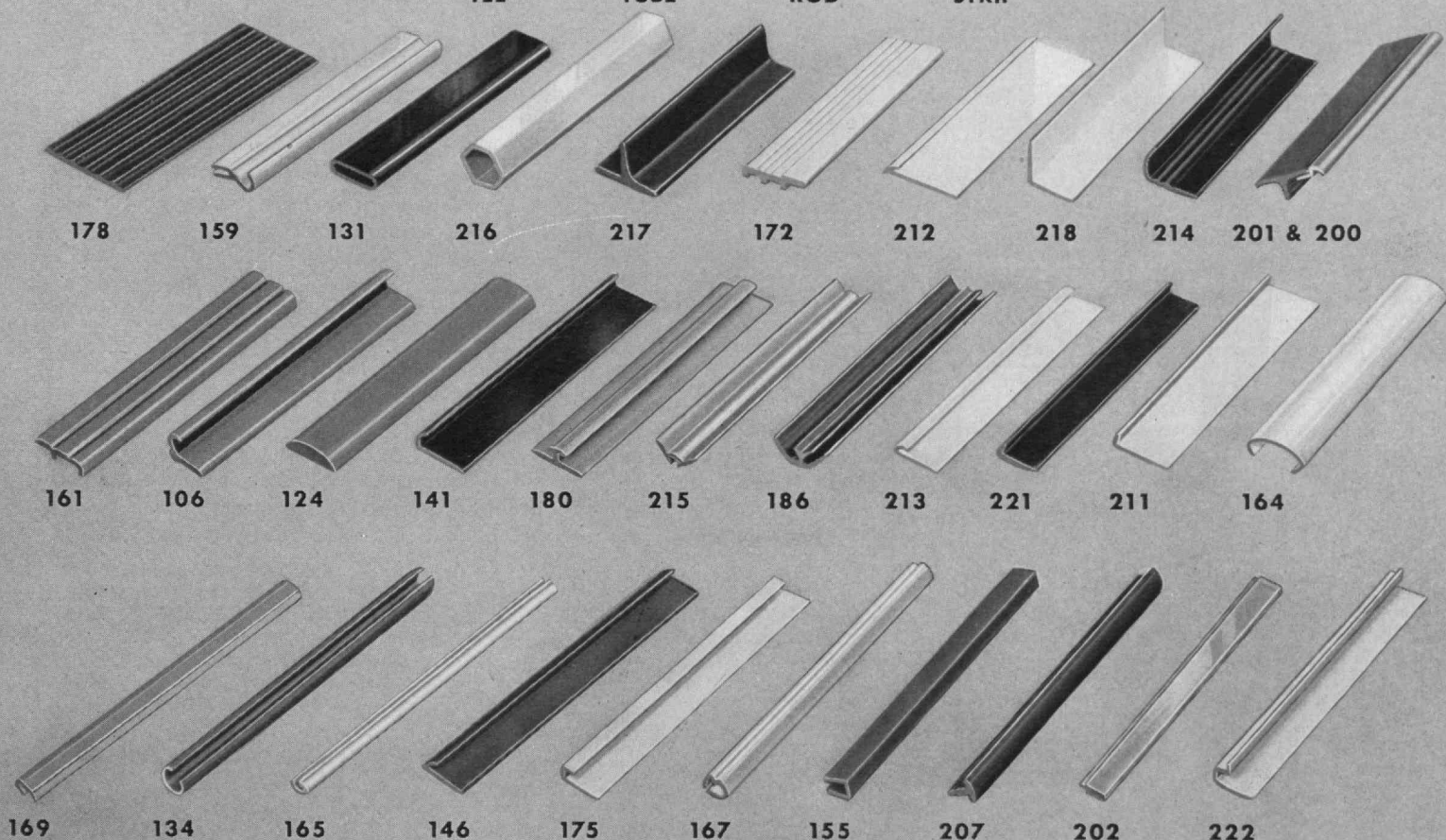


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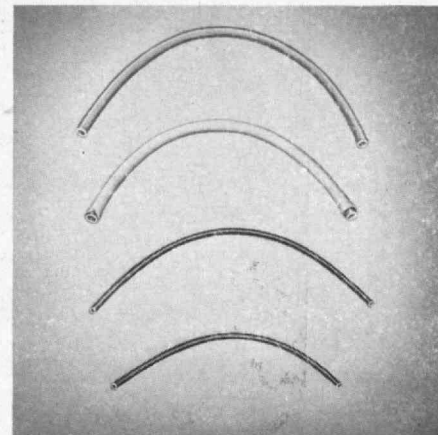
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## SCIENCE AND SOCIETY IN THE POSTWAR WORLD

(Continued from page 388)

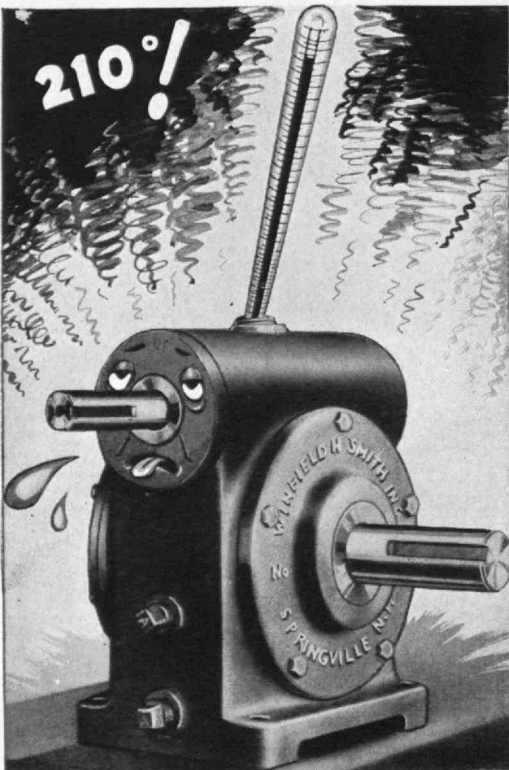
from having the satisfaction of seeing the fruits of their creative efforts. Here we come to one of the most difficult and complicated problems of modern science and industry. In pure science, publication in learned journals provides the medium of exchange. For industry, the patent system was established with the same end in view. The aim is to provide the inventor with a monopoly for a definite period of years in exchange for having "told the world" the facts about his invention. The pure scientist needs no such protection. There is little fear that his continued activities will be jeopardized if others rush into the field (though there is an unwritten code of ethics which frowns on exploiting another's scientific work).

With applied science, the case is otherwise. Large sums are required for the development of an idea or discovery. No one will risk the capital necessary for this development work (in the applied field, the equivalent of research) unless he is assured that a commercial rival will not enjoy the financial benefits which come from this investment. Either secrecy or patents protect those who put up money for applied research and the attendant developmental work. There is little doubt that, of the two, recourse to patents is far better, for then before long the information can be freely given to the scientific world by the publication of the patent.

If free private enterprise is to be abolished, then, of course, the whole situation changes and patents have no meaning. But I am assuming that our aim is to continue a system of free enterprise. For this purpose, undoubtedly certain changes in the patent laws may be desirable. It is not a simple matter to devise a system which will operate in a world bristling with new inventions and discoveries, and where interconnections between patents are of the utmost importance to the development of an art which may be in turn of great importance to the general welfare. Is not the whole problem to make the American system of free enterprise really free? But a discussion of this problem would take me too far from my subject. Let me repeat that if only one powerful group is operating in a field, whether this group be a government organization or a private laboratory, we do not have satisfactory conditions for the development of science or technology.

And now let me say just a word about scientific planning. In a recent Senate hearing, one witness stated: "The example that has been set by Russia and by our own industrial laboratories indicates plainly enough that technological progress can be made only by competent planning, direction, and organization. . . ." And another thoughtful observer of the current scene, deeply impressed by the mobilization of science for the war, has suggested that recognized leaders in the sciences must be willing to promote a research program for the national welfare, as determined by effective and realistic

(Continued on page 392)



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## SCIENCE AND SOCIETY IN THE POSTWAR WORLD

*(Continued from page 390)*

national planning. I wonder. The vision of a scientific general staff floats before my eyes. For the specific end of war, such a scientific staff might try to function. Yet even in dealing with the comparatively simple technical objectives in time of war, few realize how great are the difficulties of planning. And the goal is never clear cut in times of peace. Let the advocates of scientific planning transplant themselves backward in history, decade by decade, in the last 100 years and see if they could have planned the future. It is the essence of research that one is dealing with an unknown world.

Of course, everyone recognizes that in certain types of scientific work — public health, for one example, and the development of improvements in agricultural techniques for another — a concerted attack on a problem by several agencies may be most fruitful. No one would want to discourage scientific co-operation in any field. Meetings, conferences, even committees, play a useful part in the progress of our knowledge.

My discussions here have been primarily related to research in physics and chemistry and its application through engineering to the industrial arts of peace. When we turn to applied biology, medicine, agriculture, forestry, the conditions are somewhat different. The relations to industry and to patents, for example, take on new forms. In these fields there may be more need both for governmental bureaus — as witness our agricultural experiment stations — and more opportunity for a co-operative mapping of programs by several groups. The basic conditions of healthy research are, however, to my mind constant. Obvious explorations can be carried out by a mass attack executed under orders from a co-ordinating committee, but the really new discoveries, the really epoch-making inventions, will rarely come that way.

To sum up: I recommend to all who look with favor on postwar planning, one master plan for research. This plan has five features: (1) Provide an educational system which offers real equality of opportunity; (2) find the exceptional men among those given this opportunity while they are still in training; (3) give these men every advantage and facility in the way of machines and helping hands; (4) be certain that there are many rival and independent groups competing for scientific and technical achievement, and that no group can long perpetuate itself; and, finally, (5) beware in times of peace of co-ordinating agencies with dictatorial powers — of a peacetime scientific general staff.

Nowhere in these recommendations have I suggested how research is to be financed or how the pecuniary rewards (profits, if you will) are to be distributed. But I hope I have made evident my convictions that underlying effective scientific progress are the ideals of a free society. I should like also to make it clear that I do not believe we can have a free society on this continent by trying to return to the past. Is not our hope, rather, to provide new adjustments in our social and economic framework to meet the conditions of a changed and

*(Concluded on page 394)*



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## SCIENCE AND SOCIETY IN THE POSTWAR WORLD

(Concluded from page 392)

mechanized world to the end that we may continue free? Is it too much to expect that we can maintain at one and the same time free enterprise and mobility within our social structure — a condition under which no vested interest of governmental clique or private group will survive for long? To the extent that we approach these ideals, I believe the partnership of science and those who work for freedom will prosper and endure.

To forward such ideals is surely the duty and the privilege of our schools and colleges. For a moment, then, we may pause in the midst of war and look ahead — ahead to the time when our institutions may return to the unfettered teaching of the arts, the letters, and the sciences. When that happy day arrives, I hope that Sigma Xi and Phi Beta Kappa will do their part to foster a better understanding of the interrelation of the study of man and nature, believing with Thomas Jefferson that "a nation will be great . . . always in proportion as it is free."

## RESEARCH AND PATENTS

(Continued from page 372)

desirable method of financing research work would also be lost if the value of patents were to be greatly reduced.

Probably the most serious effect that emasculation of our patent system would have on the future of research would be to encourage the use of secret processes. This would be highly unfortunate, since one of the principal factors in the rapid advance of science and technology in the past 30 years has been the practical elimination of the secret process in favor of full disclosure and patenting as the preferable method of protecting one's rights and interests in one's invention. If a large part of the reward for disclosure is taken away, the tendency to revert to the dark ages of secret processes will be inescapable. The loss to our country would not be merely that due to the absence of competitive use of new processes, but would be even more that due to the slowing down of the exchange of basic information and new ideas.

Intercompany research conferences and reports on new lines of development would practically cease, and early publication of industrial research work would seldom be permitted. Industrial espionage would rear its ugly head, and efforts to prevent it would force the elimination of the open-door policy of most of our industrial laboratories. As Charles F. Kettering has said, "When you lock the research laboratory door you always lock out a great deal more than you lock in." Serious weakening of our patent system would inevitably result in just such a situation. Modern industry based on applied science is a great co-operative affair which cannot thrive in a world ruled by secrecy.

Another unfortunate result of secret processes would be that a small company would no longer be able, as a prospective licensee, to get full information and detailed

(Continued on page 396)

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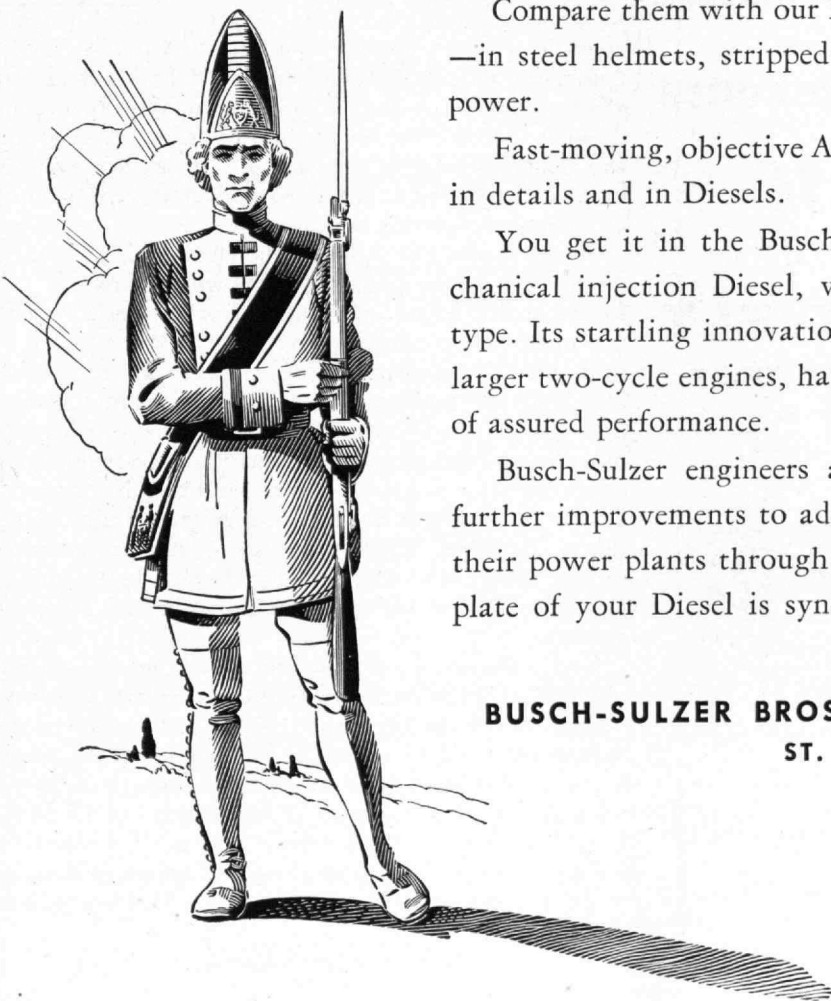
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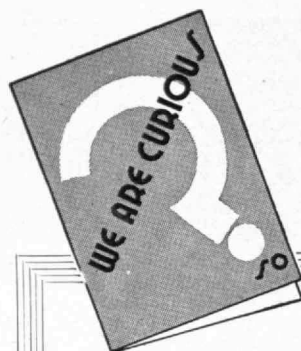
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## **RESEARCH AND PATENTS**

*(Continued from page 394)*

plans on competitive new processes. Though the owners of the secret processes might be willing to sell the know-how, they could not make prior disclosure of their processes for comparison with others, so that the small company would have either to buy a "pig in a poke" or do without.

Even workers in pure science who might discover a new principle would probably hesitate to publish it until they could work out some of the practical applications for sale on a secret-process basis, because once the new discovery was published it would largely lose its value. Although the attempt at secrecy might usually fail within a few years, the cumulative result of the loss of time between successive improvements would be a tremendous retardation of our progress. Under present conditions a new discovery is frequently published long before the patent is actually issued. The effect on the whole tempo of industrial progress is very favorable, because so little time elapses between the discovery and the general availability of the information to stimulate other researches in a variety of fields not even dreamed of by the original discoverer.

We must also not overlook the effect which a drastic weakening of our patent system would have on our future ability to get information from abroad. Foreign manufacturing conditions are usually better adapted to protecting the secrecy of processes than are conditions in this country; only the liberality of our patent system and the existence of a real market for worth-while patents have led most foreign inventors to make early application for a patent in this country. No country has, or can expect to have, a monopoly on brains. Anything, therefore, which will discourage our receiving prompt information regarding new foreign developments would be another serious bar to industrial and scientific progress.

Even although some foreign inventors might still apply for patents in their own countries, so that a certain amount of information would eventually become available to us, we could not secure the detailed plans, specifications, and know-how which can usually be obtained when it is possible to negotiate for a patent or a license. This know-how is particularly necessary on foreign patents, because their background of language and industrial technique is frequently not well understood in this country.

*(Concluded on page 398)*

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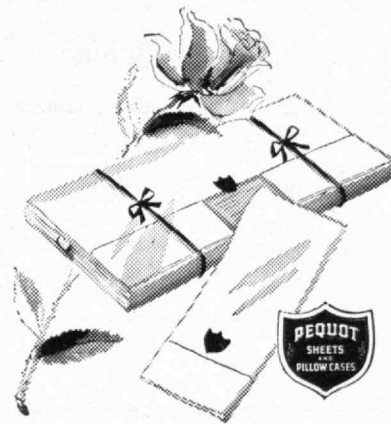
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## RESEARCH AND PATENTS

(Concluded from page 396)

In conclusion, I hope that what I have said has convinced readers that our patent system is in real jeopardy and that this jeopardy is due to public misunderstanding which, in turn, is largely due to deliberate misrepresentations of the nature of the patent monopoly and the part which patents play in encouraging inventions and prompt public disclosure of them. The inevitable alternative, secrecy, would tremendously retard the progress of both science and industry in this country. In these circumstances, it is surely incumbent upon every scientist to take his share of the job of educating the public and our legislators as to the truth about our patent system.

In many ways the most encouraging aspect of the Washington outlook was the appointment by the President of a National Patents Planning Commission under the chairmanship of Charles F. Kettering. The committee has been expressly directed by the President to conduct a comprehensive survey and study of the American patent system and to make suggestions for its permanent improvement.

Rather than being stampeded into making drastic patchwork changes as we are urged to do by some of our theorists and nonresearch industrialists, we should certainly await with confidence the completion of the studies of the commission. I think we can reasonably anticipate a report as sound and important to our industrial picture as the recent Baruch report on the rubber problem. If such a report is given the weight it deserves, I believe we can look forward with confidence to the future of research and invention in this country, which is our greatest hope for prompt postwar readjustment of our economy.

Were it my job as supersaboteur to destroy America's future greatness, I can think of no more effective way than to destroy our patent system. The tragedy is that if we permit impractical theorists and faddists to distort the facts and hypnotize our nation into this act of hara-kiri, all of us will suffer and yet no adequate punishment can be meted out to those who are really responsible.

Let us not by our inaction have any share in such a terrible responsibility.

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# TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND—ITS PROBLEMS AND GROWTH

---

## 1913 SETS THE PACE

*If I were running in the stadium, ought I  
to slacken my pace when approaching the  
goal? ought I not rather to put on speed?*

IT is questionable whether these words of Diogenes were recalled by a small group of 1913 men when they met last winter at their 30th reunion. The same thought went through their minds, however.

FOR three years 1913 had done as well as most classes in the Alumni Fund, better than some. But, as one of the men present said, "Mediocrity sleeps well in company," and those men decided that their Class deserved something better than that stamp. Accordingly, this handful of men pledged to increase their previous contributions. They pledged more than a thousand dollars, putting them well within sight of their goal, 100 per cent of the class quota.

GOALS and quotas are important only as they represent a rational attempt to achieve a worth-while objective. Of the validity of the latter these Alumni had no question. They realized that in the future economic changes would undoubtedly deplete the numbers of individuals capable of giving to M.I.T. in truly large degree. They realized that the only acceptable alternative was a large number of gifts of smaller amount, and that by far the most interested and responsive group should be Technology's own Alumni.

FURTHERMORE, they realized that the Fund quota of \$100,000 annual net to the Institute, representing the income on a \$2,500,000 increase in capital endowment, is far from excessive. Of this amount, the Class of 1913 was asked to contribute \$3,380, its fair share. Before that meeting broke up, these men had decided that this quota was not, in their own words, "a goal to shoot at, but rather one to reach."

THERE is no need to relate the details of that last-minute effort. They were approaching their goal, and like Diogenes they did not slacken pace, but rather put on speed. Not until the last day of the Fund year, March 31, was the result certain. On that day their goal was reached!

★ ★ ★ ★ ★

THE record of 1913 in the third year of the Alumni Fund is notable not because it contributed the largest amount of any Class in any year since the inception of the Fund; not because it was the first among all classes of the last 35 years to achieve its quota; not because its total showed by far the greatest increase over the previous year shown by any Class. These are incidental if important items. The really notable fact is that a group of Alumni, evaluating their own performance and finding it wanting, took matters into their own hands. No activity such as the Alumni Fund is successful because of Fund Boards or Class Agents or Directors. They merely establish a framework on which to build. Success depends entirely upon the Alumni themselves.

THE Class of 1913 has shown the way. The members of this Class have demonstrated their approval of the goal for which the Fund is striving, and they have shown their willingness, even eagerness, to do their full share. It is this spirit among her Alumni which makes Technology's future safe!



# TECHNOLOGY MEN IN ACTION

## M.I.T. MEN AT WAR

Up to April 8 over 4,100 Institute Alumni, including 15 Admirals and 50 Generals, were recorded as being in the active military or naval services of the United Nations, and 16 had already been officially decorated. New additions this month include Rear Adm. Calvin T. Durgin '25, Brig. Gen. George F. Lull '21, Brig. Gen. Don G. Shingler '21, and Brig. Gen. Stewart E. Reimel '23.

Additions and corrections to the listings which have previously appeared, beginning with the issue of November, 1942, will continue to be published in future issues of The Review. As a matter of convenience, promotions and corrections in the rank previously given are grouped under a single heading, "Changes in Rank." The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

### NEW DECORATIONS

- 1927 Glantzberg, Frederic E., *Col.*, U.S.A., Aztec Eagle—[Mexico].
- 1934 Kiefer, Dixie, *Comdr.*, U.S.N., Distinguished Service Cross and Navy Cross for extraordinary heroism at the time of the sinking of the U.S.S. *Yorktown*.
- 1938 Guttel, John, *Lt.*, U.S.A., Air Medal "in recognition of his courageous, fearless service" by Lt. Gen. George C. Kenney '11—South Pacific.
- 1939 Morrill, Manning C., *Lt.*, U.S.A., Purple Heart—North Africa.
- 1940 DiGiannantonio, Edmond P., *Lt.*, U.S.N., Purple Heart—U.S.S. *Vincennes* in South Pacific.
- 1942 Bennett, Carter L., *Lt. Comdr.*, U.S.N., Silver Star—awarded for participation in destroying 29,000 tons of enemy merchant shipping in submarine warfare.

### NEW LISTINGS

#### U.S.A.

- 1901 Johnson, Carl F., *Maj.*
- 1913 Wood, Charles H., *Capt.*
- 1919 Marshall, Harold F., *Maj.*
- 1921 Turkel, Sidney, *T/SG*
- Wirt, Williston, *Chaplain*
- 1922 Mowry, Charles E., *Capt.*
- 1923 Southard, George H., *Capt.*
- 1924 Estill, Harry F., *Maj.*
- 1926 Capone, Edmund P., *Maj.*
- Johnson, Richard W., *2nd Lt.*
- Lane, A. Howard, *Capt.*
- 1927 Silverman, Dave, *Sgt.*
- 1928 Dimock, Dexter W., *Lt.*
- Richheimer, Charles E., *1st Lt.*
- 1930 Bisson, Reginald A., *Capt.*
- Howe, Walter D., *Pvt.*
- 1931 Coyne, John B., *M/Sgt.*
- Humiston, Elliot F., *Lt.*
- Robbins, Charles, *Capt.*
- 1932 Cox, Gardner, *Capt.*
- Demas, James N., *1st Lt.*
- Lowery, G. Arthur, *Lt.*
- 1933 Coffey, Philip J., *1st Lt.*
- Hughes, George E., *Capt.*
- Lockman, Edward L., *1st Lt.*
- Sann, Edward W., Jr., *1st Lt.*
- 1934 Born, Christian E., *Capt.*
- Main, William R., *Capt.*
- 1935 Hakala, Ephraim O., *Pvt.*
- Kevorkian, George R., *Lt.*
- de Raimies, Goodwin, *Capt.*
- 1937 Dodge, Cleon C., *Capt.*
- Lappin, Leo J., *Lt.*
- Ricks, William T., Jr., *1st Lt.*
- Whitney, David J., *2nd Lt.*
- Wing, Walton M., *T/Sgt.*
- 1938 Bruneau, Armand L., *Pvt.*
- D'Angelo, Joseph E., *1st Lt.*
- Henderson, Richard, *Lt.*
- 1939 Finlay, Roswell L., *Lt.*
- Quint, Arthur S., *2nd Lt.*
- 1940 McCabe, Arthur P., *Lt.*
- 1941 Berezow, Jacob, *Pvt.*
- Crane, Leon, *1st Lt.*
- Foster, Raymond C., *Capt.*
- Francis, Arthur S., Jr., *Capt.*
- Moffat, David D., Jr., *Lt.*
- Robson, Charles D., *Lt.*
- 1942 Davison, John P., *Pvt.*
- Hotte, Alphonse P. L., *Cadet*
- Iams, John D., *2nd Lt.*

- Lewkowicz, Thaddeus B., *Lt.*
- McCarthy, William J., *Lt.*
- Myrick, John B., *Pvt.*
- Rice, William L., *2nd Lt.*
- Rines, Robert H., *2nd Lt.*
- Stein, Marvin N., *Pvt.*

#### U.S.N.

- 1914 Braff, Max M., *Lt. Comdr.*
- 1922 Didisheim, Frank M., *Lt.*
- 1925 Greatwood, H. Royce, *Lt.*
- 1930 Bockius, Robert W., *Capt.*
- Dwight, Charles T., *Lt.*
- Poole, Harry W., *Lt. Comdr.*
- 1931 Thompson, Harlon S., *Lt.*
- Deske, Standish, *Lt. (j.g.)*
- Matthews, Francis D., *Lt. (j.g.)*
- 1932 Ghiglione, Angelo F., *Lt.*
- 1934 Fleming, Edward S., *Lt. Comdr.*
- Putnam, Neil F., *Lt. (j.g.)*
- 1936 Thompson, Donald C., *Ens.*
- 1937 Healey, Charles F., *Ens.*
- Mank, Sidney, *Lt. (j.g.)*
- 1938 Englander, Robert A., *Ens.*
- Howe, Richard H., *2/C P.O.*
- 1939 Chapin, Stuart F., Jr., *Ens.*
- 1940 Church, Robert T., *Ens.*
- Robbins, Arthur W., *Ens.*
- 1941 Chandler, Cedric L., *A/S*
- 1942 Greenberg, David F., *Ens.*
- Minevitch, Liss, *A/S*
- Saathoff, George T., *Ens.*

#### U.S.C.G.

- 1902 Borden, Norman E., *Lt.*

### CHANGES IN RANK

#### U.S.A.

- 1911 Richmond, Carl G., *Lt. Col. to Col.*
- 1916 Bagby, Ralph B., *Maj. to Col.*
- 1921 Lull, George F., *Col. to Brig. Gen.*
- Phaneuf, Victor S., *Capt. to Maj.*
- Shingler, Don G., *Col. to Brig. Gen.*
- 1922 Brokaw, Charles E., *Maj. to Lt. Col.*
- Silverman, Abraham G., *Lt. Col. to Col.*
- 1923 Arthur, Joseph D., Jr., *Lt. Col. to Col.*
- Meekins, Raymond M., *Lt. to Maj.*
- Reimel, Stewart E., *Maj. to Brig. Gen.*
- 1924 Henry, Stephen G., *Brig. Gen. to Maj. Gen.*
- Lewis, Burton F., *Lt. Col. to Col.*
- 1925 Dunbar, John C., *Maj. to Lt. Col.*
- Franks, John B., *Capt. to Col.*
- 1926 Salmon, I. Chenery, *Capt. to Maj.*
- 1927 Auchincloss, Samuel S., Jr., *Lt. Col. to Col.*
- Cheney, Laurence B., *Capt. to Maj.*
- Sadtler, William F., *Lt. Col. to Col.*
- Whittaker, Alan D., Jr., *Capt. to Maj.*
- 1928 Rutherford, Francis H., *Capt. to Maj.*
- 1929 Zak, Frederick J., *Capt. to Maj.*
- 1930 Dixon, Marvin H., *Maj. to Lt. Col.*
- Gonzalez, Lawrence N., *Lt. to Capt.*

- 1931 Morin, Arsène W., *Lt. to Maj.*
- 1932 McGraw, James E., *Lt. to Lt. Col.*
- Northam, Charles E., *Lt. to Capt.*
- Sears, Thomas E., Jr., *Lt. to Capt.*
- 1933 Mills, James P., *Lt. to Capt.*
- 1934 Churchill, W. Randolph, *Capt. to Maj.*
- Daleda, Joseph, *Capt. to Maj.*
- Hammonds, G. Scott, *Lt. to Capt.*
- 1935 Altglass, Adam, *Lt. to Capt.*
- Lane, Stanley M., *Lt. to Capt.*
- 1936 Austin, John C., *Capt. to Maj.*
- Werblin, David A., *Lt. to Capt.*
- 1937 Albiston, Roger C., *Capt. to Maj.*
- Dreissigacker, Philip H., *Lt. to Capt.*
- Hobson, Edwin L., 3rd, *Capt. to Maj.*
- Salny, Jerome E., *Capt. to Maj.*
- Smedile, Joseph A., *Capt. to Maj.*
- Stern, Harry S., Jr., *Lt. to Capt.*
- 1938 Black, Paul B., *Lt. to Capt.*
- Bruce, Burton B., *Capt. to Lt. Col.*
- Fisher, Hillary J., *Pvt. to T/S*
- Gordon, Maurice B., *Pvt. to 2nd Lt.*
- Griffin, Gifford, *Lt. to Capt.*
- McEvoy, Leo C., Jr., *Lt. to Capt.*
- Whittaker, John W., *Lt. to Capt.*
- 1939 Brewster, William S., *Lt. to Capt.*
- Chance, William M., Jr., *Lt. to Capt.*
- Evans, J. Warren, *Lt. to Capt.*
- 1940 Losco, Ezekiel F., *Lt. to Capt.*
- Bowman, Thomas P., *2nd Lt. to Capt.*
- Jackson, Kingsbury T., *2nd Lt. to 1st Lt.*
- Michelson, Louis, *Lt. to Capt.*
- Orpen, J. Harry, *Lt. to Capt.*
- Scott, Norman R., *Lt. to Capt.*
- Smith, Oliver K., *Lt. to Capt.*
- 1941 Andino, Jose A., *Lt. to Capt.*
- Fairbrother, Raymond M., *Lt. to Capt.*
- Harris, Cullie B., *Lt. to Capt.*
- Howard, Donald A., *Lt. to Capt.*
- McNally, David S., *Lt. to Capt.*
- Moody, Herbert R., *Lt. to Capt.*
- 1942 Young, Cecil G., *Cadet to Lt.*
- Landes, Herbert D., Jr., *Pvt. to 1st Lt.*

#### U.S.N.

- 1901 Bittinger, Charles, *Lt. Comdr. to Comdr.*
- 1906 Hamner, Edward C., Jr., *Comdr. to Capt.*
- 1908 Ferris, Raymond W., *Lt. to Lt. Comdr.*
- 1917 Sullivan, William A., *Comdr. to Capt.*
- 1921 Crecia, John D., *Comdr. to Capt.*
- Fowler, Joseph W., *Comdr. to Capt.*
- McKee, Andrew I., *Comdr. to Capt.*
- 1922 Fish, Howell C., *Lt. Comdr. to Comdr.*

- Hains, Paul W., *Comdr. to Capt.*
- Hindes, Barrett G., *Lt. Comdr. to Comdr.*
- Kitts, Willard A., 3d., *Comdr. to Capt.*
- 1923 Sexton, Horatio C., *Comdr. to Capt.*
- 1924 Stump, Felix B., *Comdr. to Capt.*
- 1925 Durgin, Calvin T., *Capt. to Rear Adm.*
- 1926 Woodason, Morton P., *Lt. to Lt. Comdr.*
- 1928 Kirk, William J., *Lt. to Lt. Comdr.*
- 1929 Crist, Marion E., *Comdr. to Capt.*
- 1931 Thomas, Norman C., *Lt. (j.g.) to Lt.*
- True, Arnold E., *Lt. Comdr. to Comdr.*
- 1934 Wirtz, Paul C., *Comdr. to Capt.*
- Burke, James H., *Ens. to Lt. (j.g.)*
- 1937 Bowen, Harold G., Jr., *Lt. to Lt. Comdr.*
- Lewis, I. Rupert, *Ens. to Lt. (j.g.)*
- 1938 Baron, Sidney, *Mid. to Ens.*
- Wagner, Alfred F., *Ens. to Lt. (j.g.)*
- Wright, David A., *Ens. to Lt. (j.g.)*
- 1939 West, John A., Jr., *Ens. to Lt. (j.g.)*
- 1940 Lamson, Paul H., *Ens. to Lt. (j.g.)*
- Pieczentkowski, Herman A., *Lt. to Lt. Comdr.*
- Ward, Alfred G., *Lt. to Lt. Comdr.*
- 1941 Fleet, John P., *Ens. to Lt. (j.g.)*
- 1942 Bennett, Carter L., *Lt. to Lt. Comdr.*
- Kline, William E., *Ens. to Lt. (j.g.)*

#### U.S.C.G.

- 1922 Davis, Kenneth S., *Lt. to Lt. Comdr.*
- 1940 Walker, Phelps A., *Cadet to Ens.*

#### U.S.M.C.

- 1942 Lawrence, Charles H., *Pvt. to 2nd Lt.*

### RANK NOT PREVIOUSLY PUBLISHED

- 1940 Hawes, Harold D., *1st Lt., U.S.A.*
- 1942 Covitt, Arthur L., *2nd Lt., U.S.A.*
- Gallagher, John F., *2nd Lt., U.S.A.*
- Gleeson, Thomas A., *Lt., U.S.A.*
- Longacre, Arthur M., *1st Lt., U.S.A.*
- Pack, Albert B., *Lt., U.S.A.*

### CASUALTIES

- 1933 † Latimer, William J., *Capt., U.S.A.*
- 1940 \* Stone, George R., *Lt. Comdr., U.S.N.*
- 1942 \* Kelley, Charles F., Jr., *Capt., U.S.A.; North Africa, March 9, 1943.*

★ Killed in Action.

\* Died in Service.

† Reported Missing in Action.

# ALUMNI AND OFFICERS IN THE NEWS

## For Freedom's Holy Light

¶ GEORGE C. KENNEY '11 directed American Air Forces in the Battle of the Bismarck Sea. Lieutenant General Kenney's airmen inflicted a crushing defeat on a 22-ship Japanese convoy off the coast of New Guinea.

¶ WILLIAM A. SULLIVAN '17 directed salvage operations for the Navy on a freighter at a North African port. Captain Sullivan, called "one of the world's best salvage men," last spring directed the raising of the *Normandie*.

¶ CARLETON C. CHAMPION, JR., '29 now commands the Norfolk Naval Air Station. Holder of two world records for high flights in sea and land planes, Captain Champion is considered one of the world's foremost air-plane pilots.

¶ JAY ZEAMER, JR., '40 took part in a moonlight raid on Japanese airdromes in New Guinea. When he had finished his bombing, Lieutenant Zeamer, a pilot of the Army Air Forces, swept low over the water and made several strafing passes at a small boat.

¶ ARTHUR A. FLETCHER '41 was among the United States pilots who smashed the large Japanese convoy in the Bismarck Sea. According to the records of "M.I.T. Men at War," Captain Fletcher has been awarded more decorations than any other Technology Alumnus.

## Professorial Prophecies

¶ BY SAMUEL C. PRESCOTT '94, in a speech before the members of the Boston section of the American Society of Refrigeration Engineers. At a meeting held at M.I.T., Professor Prescott outlined the future possibilities of the dehydration industry.

¶ BY F. ALEXANDER MAGOUN '18, in a lecture on "The Art of Human Relations," at a meeting of the Rotary Club of Rochester, N.Y.

¶ BY WALTER C. VOSS '32, in a discussion of "Building Construction in the Post-War Period," at a meeting of the brokers' board of the Massachusetts Real Estate Exchange.

¶ BY WYMAN P. FISKE, staff, in a speech on "An Accountant Looks at Business Risks," at a meeting of the Detroit chapter of the National Association of Cost Accountants. Professor Fiske is national president of the association.

¶ BY ALBERT A. SCHAEFER, staff, in an address at a luncheon meeting of the Aleppo Temple of the Mystic Shrine in Boston. Professor Schaefer is grand master of the Grand Lodge of Masons in Massachusetts.

## Off the Press

¶ BY MEMBERS OF THE STAFF of the Department of Electrical Engineering of M.I.T., *Applied Electronics*, John Wiley-Technology Press.

¶ BY THOMAS C. DESMOND '09, "State Governments in War Time," *Christian Science Monitor*, March 22.

¶ BY ALFRED P. MORGAN '12, *Getting Acquainted with Electricity*, Appleton-Century.

¶ BY MAX J. STEINBERG '22 and THEODORE H. SMITH, *Economy Loading of Power Plants and Electric Systems*, John Wiley.

¶ BY MURRAY F. GARDNER '24 and JOHN L. BARNES '28, *Transients in Linear Systems*, Vol. I, John Wiley.

¶ BY HENRY B. KANE '24, *The Tale of the Crow and The Tale of the Prometheus Moth*, illustrated by the author, Alfred A. Knopf.

¶ BY EDWIN A. BOYAN '36, *Handbook of War Production*, McGraw-Hill.

¶ BY THOMAS R. P. GIBB, JR., '40, *Optical Methods of Chemical Analysis*, McGraw-Hill.

¶ BY OTTO ZMESKAL '41, *Radio-graphic Inspection of Metals*, Harper.

¶ BY KARL T. COMPTON, President, "Isaiah Bowman, President of the American Association for the Advancement of Science," *Science*, April 2.

## On the Platform

¶ THOMAS C. DESMOND '09, who spoke on the "Ruml Pay-as-You-Go Plan for New York State," at a luncheon meeting at the City Club of Albany.

¶ JOEL A. GOLDTHWAIT '20, who spoke on the "Controlled Materials Plan," before a meeting of the Bridgeport, Conn., chapter of the National Association of Cost Accountants.

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¶ RONALD H. ROBNETT, staff, who presided over a meeting of the Boston chapter of the National Association of Cost Accountants. The subject of the meeting was "Producing for War."

## DEATHS

\* Mentioned in class notes.

¶ CHARLES T. MAIN '76, March 6. (See '09 notes.)

¶ FRANK A. PAGE '80, August 19.

¶ J. DELANO WOOD '89, January 19.

¶ CHARLES F. KOCH '90, February 17.

¶ RICHARD W. HALE '91, March 5.\*

¶ WILLIAM W. CARTER '93, March 2.\*

¶ EDWARD S. SANDERSON '93, February 13.\*

¶ GEORGE A. NICHOLS '95, February 26.

¶ MERTON A. HOLMES '99, June 16.

¶ HAROLD O. BOSWORTH '02, January 31.\*

¶ FRANK J. EAGER '02, February 27.\*

¶ SHELDON K. BAKER '03, July 12.\*

¶ CHARLES W. BEVERSTOCK '03, March 13.

¶ JAMES M. GAMMONS '03, November 2.\*

¶ FLOYD T. TAYLOR '03, January 9.\*

¶ HENRY S. SPAULDING '05, May 8, 1942.\*

¶ ROBERT J. LYONS '06, January 13.

¶ HARRY R. CROHURST '07, March 12.

¶ LESTER D. POORE '10, June 14.

¶ STANLEY M. BURROUGHS '11, March 25.

¶ ROLAND B. WELLS '11, March 11.

¶ OTTO W. FICK '14, August 2.

¶ FREDERIC A. BAKER '19, March 26.

¶ JOSEPH P. LAWLER '20, February 15.\*

¶ ISRAEL L. GOVERMAN '22, February 10.

¶ EDMUND T. ALLEN '23, February 18.\*

¶ PARKER MORELL '28, March 17.

¶ LUTHER W. KITES '38, March 27.



# TECHNOLOGY MEN IN ACTION

## M.I.T. MEN AT WAR

Up to April 8 over 4,100 Institute Alumni, including 15 Admirals and 50 Generals, were recorded as being in the active military or naval services of the United Nations, and 16 had already been officially decorated. New additions this month include Rear Adm. Calvin T. Durgin '25, Brig. Gen. George F. Lull '21, Brig. Gen. Don G. Shingler '21, and Brig. Gen. Stewart E. Reimel '23.

Additions and corrections to the listings which have previously appeared, beginning with the issue of November, 1942, will continue to be published in future issues of The Review. As a matter of convenience, promotions and corrections in the rank previously given are grouped under a single heading, "Changes in Rank." The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

### NEW DECORATIONS

- 1927 Glantzberg, Frederic E., Col., U.S.A., Aztec Eagle—[Mexico].
- 1934 Kiefer, Dixie, Comdr., U.S.N., Distinguished Service Cross and Navy Cross for extraordinary heroism at the time of the sinking of the U.S.S. Yorktown.
- 1938 Guttel, John, Lt., U.S.A., Air Medal "in recognition of his courageous, fearless service" by Lt. Gen. George C. Kenney '11—South Pacific.
- 1939 Morrill, Manning C., Lt., U.S.A., Purple Heart—North Africa.
- 1940 DiGiannantonio, Edmond P., Lt., U.S.N., Purple Heart—U.S.S. Vincennes in South Pacific.
- 1942 Bennett, Carter L., Lt. Comdr. U.S.N., Silver Star—awarded for participation in destroying 29,000 tons of enemy merchant shipping in submarine warfare.

### NEW LISTINGS

#### U.S.A.

- 1901 Johnson, Carl F., Maj.
- 1913 Wood, Charles H., Capt.
- 1919 Marshall, Harold F., Maj.
- 1921 Turkel, Sidney, T/SG
- 1922 Wirt, Williston, Chaplain
- 1923 Mowry, Charles E., Capt.
- 1924 Southard, George H., Capt.
- 1924 Estill, Harry F., Maj.
- 1926 Capone, Edmund F., Maj.
- Johnson, Richard W., 2nd Lt.
- Lane, A. Howard, Capt.
- 1927 Silverman, Dave, Sgt.
- 1928 Dimock, Dexter W., Lt.
- Richheimer, Charles E., 1st Lt.
- 1930 Bisson, Reginald A., Capt.
- Howe, Walter D., Pvt.
- 1931 Coyne, John B., M/Sgt.
- Humiston, Elliot F., Lt.
- Robbins, Charles, Capt.
- Cox, Gardner, Capt.
- 1932 Demas, James N., 1st Lt.
- Lowery, G. Arthur, Lt.
- 1933 Coffey, Philip J., 1st Lt.
- Hughes, George E., Capt.
- Lockman, Edward L., 1st Lt.
- Sann, Edward W., Jr., 1st Lt.
- 1934 Born, Christian E., Capt.
- Main, William R., Capt.
- 1935 Hakala, Ephraim O., Pvt.
- Kevorkian, George R., Lt.
- de Raismes, Goodwin, Capt.
- 1937 Dodge, Cleon C., Capt.
- Lappin, Leo J., Lt.
- Ricks, William T., Jr., 1st Lt.
- Whitney, David J., 2nd Lt.
- Wing, Walton M., T/Sgt.
- 1938 Bruneau, Armand L., Pvt.
- D'Angelo, Joseph E., 1st Lt.
- Henderson, Richard, Lt.
- 1939 Finlay, Roswell L., Lt.
- Quint, Arthur S., 2nd Lt.
- 1940 McCabe, Arthur P., Lt.
- Berezow, Jacob, Pvt.
- 1941 Crane, Leon, 1st Lt.
- Foster, Raymond C., Capt.
- Francis, Arthur S., Jr., Capt.
- Moffat, David D., Jr., Lt.
- Robson, Charles D., Lt.
- 1942 Davison, John P., Pvt.
- Hotte, Alphonse P. L., Cadet
- Iams, John D., 2nd Lt.

- Lewkowicz, Thaddeus B.
- McCarthy, William J., Lt.
- Myrick, John B., Pvt.
- Rice, William L., 2nd Lt.
- Rines, Robert H., 2nd Lt.
- Stein, Marvin N., Pvt.

#### U.S.N.

- 1914 Braff, Max M., Lt. Comdr.
- 1922 Didisheim, Frank M., Lt.
- 1925 Greatwood, H. Royce, Lt.
- 1930 Bockius, Robert W., Capt.
- Dwight, Charles T., Lt.
- Poole, Harry W., Lt. Comdr.
- Thompson, Harlon S., Lt.
- 1931 Deake, Standish, Lt. (j.g.)
- Matthews, Francis D., Lt. (j.g.)
- 1932 Ghiglione, Angelo F., Lt.
- 1934 Fleming, Edward S., Lt. Comdr.
- Putnam, Neil F., Lt. (j.g.)
- 1936 Thompson, Donald C., Ens.
- 1937 Healey, Charles F., Ens.
- Mank, Sidney, Lt. (j.g.)
- 1938 Englander, Robert A., Ens.
- Howe, Richard H., 2/C P.O.
- 1939 Chapin, Stuart F., Jr., Ens.
- Church, Robert T., Ens.
- Robbins, Arthur W., Ens.
- 1941 Chandler, Cedric L., A/S
- 1942 Greenberg, David F., Ens.
- Minevitch, Lisa, A/S
- Saathoff, George T., Ens.

#### U.S.C.G.

- 1902 Borden, Norman E., Lt.

### CHANGES IN RANK

#### U.S.A.

- 1911 Richmond, Carl G., Lt. Col. to Col.
- 1916 Bagby, Ralph B., Maj. to Col.
- 1921 Lull, George F., Col. to Brig. Gen.
- Phaneuf, Victor S., Capt. to Maj.
- Shingler, Don G., Col. to Brig. Gen.
- 1922 Brokaw, Charles E., Maj. to Lt. Col.
- Silverman, Abraham G., Lt. Col. to Col.
- 1923 Arthur, Joseph D., Jr., Lt. Col. to Col.
- Meekins, Raymond M., Lt. to Maj.
- Reimel, Stewart E., Maj. to Brig. Gen.
- 1924 Henry, Stephen G., Brig. Gen. to Maj. Gen.
- Lewis, Burton F., Lt. Col. to Col.
- 1925 Dunbar, John C., Maj. to Lt. Col.
- Franks, John B., Capt. to Col.
- 1926 Salmon, I. Chenery, Capt. to Maj.
- 1927 Auchincloss, Samuel S., Jr., Lt. Col. to Col.
- Cheney, Laurence B., Capt. to Maj.
- Sadtler, William F., Lt. Col. to Col.
- Whittaker, Alan D., Jr., Capt. to Maj.
- 1928 Rutherford, Francis H., Capt. to Maj.
- 1929 Zak, Frederick J., Capt. to Maj.
- 1930 Dixon, Marvin H., Maj. to Lt. Col.
- Gonzalez, Lawrence N., Lt. to Capt.

- 1931 Morin, Arsène W., Lt. to Maj.
- 1932 McGraw, James E., Lt. to Lt. Col.
- Northam, Charles E., Lt. to Capt.
- Sears, Thomas E., Jr., Lt. to Capt.
- 1933 Mills, James P., Lt. to Capt.
- 1934 Churchill, W. Randolph, Capt. to Maj.
- Daled, Joseph, Capt. to Maj.
- Hammonds, G. Scott, Lt. to Capt.
- 1935 Altglass, Adam, Lt. to Capt.
- Lane, Stanley M., Lt. to Capt.
- 1936 Austin, John C., Capt. to Maj.
- Werblin, David A., Lt. to Capt.
- 1937 Albiston, Roger C., Capt. to Maj.
- Dreissigacker, Philip H., Lt. to Capt.
- Hobson, Edwin L., 3rd, Capt. to Maj.
- Salny, Jerome E., Capt. to Maj.
- Smedley, Joseph A., Capt. to Maj.
- Stern, Harry S., Jr., Lt. to Capt.
- 1938 Black, Paul B., Lt. to Capt.
- Bruce, Burton B., Capt. to Lt. Col.
- Fisher, Hillary J., Pvt. to T/S
- Gordon, Maurice B., Pvt. to 2nd Lt.
- Griffin, Gifford, Lt. to Capt.
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- 1939 Brewster, William S., Lt. to Capt.
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- Bowman, Thomas P., 2nd Lt. to Capt.
- Jackson, Kingsbury T., 2nd Lt. to 1st Lt.
- Michelson, Louis, Lt. to Capt.
- Orpen, J. Harry, Lt. to Capt.
- Scott, Norman R., Lt. to Capt.
- Smith, Oliver K., Lt. to Capt.
- 1941 Andino, Jose A., Lt. to Capt.
- Fairbrother, Raymond M., Lt. to Capt.
- Harris, Cullie B., Lt. to Capt.
- Howard, Donald A., Lt. to Capt.
- McNally, David S., Lt. to Capt.
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- Hindes, Barrett G., Lt. Comdr. to Comdr.
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- 1926 Woodason, Morton P., Lt. to Lt. Comdr.
- 1928 Kirk, William J., Lt. to Lt. Comdr.
- 1929 Crist, Marion E., Comdr. to Capt.
- 1931 Thomas, Norman C., Lt. (j.g.) to Lt.
- True, Arnold E., Lt. Comdr. to Comdr.
- Wirtz, Paul C., Comdr. to Capt.
- 1934 Burke, James H., Ens. to Lt. (j.g.)
- 1937 Bowen, Harold G., Jr., Lt. to Lt. Comdr.
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- 1940 Walker, Phelps A., Cadet to Ens.

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¶ J. DELANO WOOD '89, January 19.

¶ CHARLES F. KOCH '90, February 17.

¶ RICHARD W. HALE '91, March 5.\*

¶ WILLIAM W. CARTER '93, March 2.\*

¶ EDWARD S. SANDERSON '93, February 13.\*

¶ GEORGE A. NICHOLS '95, February 26.

¶ MERTON A. HOLMES '99, June 16.

¶ HAROLD O. BOSWORTH '02, January 31.\*

¶ FRANK J. EAGER '02, February 27.\*

¶ SHELDON K. BAKER '03, July 12.\*

¶ CHARLES W. BEVERSTOCK '03, March 13.

¶ JAMES M. GAMMONS '03, November 2.\*

¶ FLOYD T. TAYLOR '03, January 9.\*

¶ HENRY S. SPAULDING '05, May 8, 1942.\*

¶ ROBERT J. LYONS '06, January 13.

¶ HARRY R. CROHURST '07, March 12.

¶ LESTER D. POORE '10, June 14.

¶ STANLEY M. BURROUGHS '11, March 25.

¶ ROLAND B. WELLS '11, March 11.

¶ OTTO W. FICK '14, August 2.

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¶ JOSEPH P. LAWLER '20, February 15.\*

¶ ISRAEL L. GOVERMAN '22, February 10.

¶ EDMUND T. ALLEN '23, February 18.\*

¶ PARKER MORELL '28, March 17.

¶ LUTHER W. KITES '38, March 27.



# NEWS FROM THE CLUBS AND CLASSES

## CLUB NOTES

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of ladies to the clubhouse on a day when it is most likely to be of real benefit to the members and in a manner which will least inconvenience those who do not wish to take advantage of the innovation. We hope that it will substantially increase the Club's business.

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was given with the understanding that no reporters were to be present, your Review Secretary refrains from comment except to remark that the talk was most interesting.

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"He is very much interested, as we all are, to know about Mr. Colgan's part in the creation of the 'Minuteman,' and he wishes to congratulate the Class of '77 for its contribution to what is proving to

1877 Continued

be the most extensive popular-financing program of all time."

The Class Secretary regrets that he did not know at the time of our 66th reunion that on January 24, only six days before our meeting, Mr. and Mrs. Frederick W. Wood of Baltimore celebrated their 59th wedding anniversary. They would surely have appreciated a message of felicitation from us. — GEORGE W. KITTREDGE, *Secretary*, 592 North Broadway, Yonkers, N.Y.

## 1888

On and after May 1, your Secretary expects to be on Chebeague Island, Maine, his summer home, where he will supervise the planting of peas, lettuce, carrots, corn, potatoes, and 15 other kinds of vegetables in his garden, which is 100 feet long and 75 feet wide. The soldiers encamped near by should keep off the enemy as well as the crows and pheasants, which created havoc last year.

On March 11, Ellison C. Means of Ashland, Ky., wrote the following letter from Lakeland, Fla.: "Mrs. Means and I celebrated our golden wedding anniversary on October 5 in our home at Ashland, Ky. Our daughter surprised us by inviting a number of our friends and kinsfolk.

"Our son, John R., is in North Africa. He was in France in 1918 as a private. He volunteered a year ago and was commissioned a captain. In November he was made a major and was sent over in December with a group of the Air Forces. He was graduated from Dartmouth in 1921.

"We have a granddaughter, who was graduated from Smith in 1942, and will probably be making war maps in San Antonio, Texas, this summer. Her mother was graduated from Smith in 1916. . . . I have not met any '88 men for quite a number of years. I was graduated from golf two years ago."

Ladd, in Tulsa, Okla., says that he has a great-grandson, born recently, who gains eight ounces daily. If he keeps this up, he will equal his great-grandfather's 210 pounds — Ladd's fighting and football weight in 1887.

Deacon Smith commuted from North Hampton, N.H., to Boston and return each day for over four years. He traveled over 84 thousand miles. He is credited with a trip to Washington, D.C., to attend the November-December meeting of the Washington Society of the M.I.T., but according to the following letter he did not attend this meeting: "I don't wonder you were surprised to see my name heading the list of names at Washington, for in fact I was myself surprised. As a matter of fact, I wasn't there. I am still puzzled as to how my name happened to be on the list.

"You may have seen the notice of the death of the widow of our classmate J. C. T. Baldwin.

"This winter I am leading a very quiet life, attending to the duties of my various town offices — tax collector, school treasurer, library trustee, and treasurer of trust funds. This is about all I do, except that our church treasurer has gone into

the service, and I have taken up those duties again. A few years ago I laid them down after serving as church treasurer for 50 years."

Our Class President, Ned Webster, is helping the war effort by building TNT plants and arsenals. He is also boosting morale by running the only major flower show in the United States this year. This is the fourth war during which the show has been given. The following excerpt is from an article in the *Boston Herald*: "Mr. Edwin S. Webster, president of the Massachusetts Horticultural Society . . . is enthusiastic over the prospects of this year's show, which will take place in spite of wartime difficulties. The only major flower show to be held in the United States this year, it will take place in Horticultural Hall. . . ."

Before going to Maine, the Secretary is planning to go to Pass-a-Grille, Fla., for a few weeks to visit his daughter, who is the wife of Lieutenant Commander E. C. Mayer of the Navy. — BERTRAND R. T. COLLINS, *Secretary*, Chebeague Island, Maine. SANFORD E. THOMPSON, *Assistant Secretary*, The Thompson and Lichtner Company, Inc., 620 Newbury Street, Boston, Mass.

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Welles and Mrs. Bosworth were in Boston recently, both looking extremely fit. The address of Howard B. Emery is now 411 Grove Street, North, St. Petersburg, Fla. William B. Willim's address is Southton, Texas.

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The Secretary was interested to learn from Parker Fiske of the success he has had with "Fire Magic Fiskelox Stix." He has shipped them to every state in the Union and to Canada, Alaska, Hawaii, and many other countries. He estimates

that a million people have enjoyed this attractive little invention. — WALTER H. KILHAM, *Secretary*, 126 Newbury Street, Boston, Mass.

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Richard W. Hale died on March 5 at Dover, Mass. He had been on our class list, but only went to Technology for a short time. He expressed interest in our Class and M.I.T., however; he replied to our letters; and he once wrote: "I am always glad to pay my part and keep up with my old friends in the Class." The following is taken from the *Boston Herald*: "Richard Walden Hale, 71, distinguished attorney, public official and author, died . . . at his home in Dover after a brief illness. He was senior member of the law firm of Hale and Dorr at 60 State street. . . ."

"In the field of public affairs he held posts as a member of the House of Representatives and was United States commissioner for 18 years. He also held civic posts in Dover and Bar Harbor, Me., where he made his summer home. A defender of free speech and public expression, he was vice-president of the Ford Hall Forum and active in its affairs, and treasurer of the Old South Association. He was secretary of the Bar Association of this city and a member of its council.

"In addition to numerous magazine articles, he was the author of two books: 'The Dreyfus Case' and 'The Letters of Warwick Greene.'

"He was born in Milton, the son of George Sillsbee Hale and Ellen (Sever) Hale, of a family that came to this country in the middle of the 17th century. He was educated at Massachusetts Institute of Technology, Harvard, and Harvard Law School. He became a member of the bar in 1895, with the firm of Hale and Fiske, which later became Hale and Grinnell, then Hale, Grinnell and Swaim, and finally Hale and Dorr. He leaves his widow, the former Mary Newbold Patterson of Dover, and a son, Richard Walden Hale, Jr., of Chicago."

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The Algonquin Club treated us in a most satisfactory manner, as usual, and all those present seemed well and hearty. Colburn says he has his shop going well



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1891 Continued

on war work. Damon talks of a trip south but thinks it has its difficulties. After dinner, Frank Howard showed us some of his and Fiske's Kodachrome stills. Frank says he has some interesting colored movies, which we should like to see at some future gathering.

While our list is not so long as it used to be, there are still over 60 who are interested in our affairs. They are well scattered, with about half that number available for our dinner parties. There has been only one death since January 1—that of Richard Hale, as already noted.

Ed Smith and Billy Dart both wrote that they did not have any enthusiasm for class dinners under present conditions and suggested war bonds or something. Apparently quite a number feel differently and agree with your Secretary that getting together once in a while is not only in order but a real pleasure which helps our morale. This is especially true of those of us who are still "on the firing line," trying to do our bit. We feel that to meet with old friends for a dinner and an evening get-together sends us back to our homes or jobs all the better for the change. As Frank Howard says: "It will probably do us all good to talk over better days and have a chance to tell our troubles to a set of people we don't meet every day." We agree that distance adds to the present difficulties and each one must decide for himself. Ed is just getting out again and says he will feel better when he is steady on the job.

Ernest Hersam writes from Berkeley, Calif.: "I thank you and the other men of the Class who are doing so much to keep up the spirit of '91. I wish we all could overcome the restrictions of distance, health, finance, and time that keep us so remote in our assigned corners of the big bad earth. I always examine *The Review*, and I am always with you as far as the limitations permit."

Arthur Alley wrote in January of his move to La Jolla from National City, Calif.: "I was delighted when I received your letter of January 14, but to hear the news about some of the boys who are ill and others who are with us no longer made me feel rather sad. We can't halt the laws of nature, and our own kind of philosophy must be called upon to help us."

"My sister and I found it was impossible to keep our ranch house operating, because of lack of servants, so we have bought a small house at the above address. The house is easily cared for and there are stores and eating places within a five-minute walk. These conditions make us independent, and we get along without any help. Viele lives up north about 150 miles, and so does Kimball. Garrison is still at Santa Barbara. I have not seen any of them since George Hooper's funeral, which we all attended. . . . Good luck and kindest regards to all my pals."

Walter Douglass wrote Dana some time ago and sent a partial list of names applicable to the picture in our class book—the graduating Class of '91 on Rogers steps. Several of us added to the list, and

we sent a blueprint and list to a number in the Class. Some replies came in, and out of a total of about 120 we have all but about 15 labeled (correctly or not). If anyone is interested, we shall send him the corrected list.

Help! We have lost Charlie Ricker. A letter to him at Salamanca, N.Y., his last address, was forwarded to Alexandria, Va., and then returned. Perhaps he is in Havana.

George Spooner helped fill in some of the names in the class picture. He is good at that. He wrote that he had a fall in the snow and sprained his wrist. He says the accident certainly was a great nuisance.

Charlie Garrison wrote to Howard Forbes and your Secretary. He still thinks the weather is pretty good in Santa Barbara. He wrote: "How we wish that you could come out here. . . . Our house, 501 East Pedregosa Street, has a wide piazza across the front, with a fine view of the ocean. There is a glassed-in piazza leading out of the parlor at the side. There is a larger back yard for garage, with two avocado trees, two small orange trees, and a hedge of guavas on the side street."

"We miss the motoring. We can save enough gas to drive to our son's and back about every two months. We can't go to San Francisco, or rather Berkeley, where our daughter is at work. We enjoy music from our records on our Capehart machine, as I have a rather fine library—some 300 pieces—largely classic. We have kept very well; life is a bit easier in this climate. The food rationing hasn't troubled us much yet, as we live simply."

Walter Douglass wrote to Dana last February: "It is just like summer here now. Everyone out in the open—no coats, no hats, and no heating needed in the houses. The windows are open all the time. . . ."

"The Navy air field here is in full swing and the fliers do some real stunt work over the ocean in their regular training, for this is their final preparation before active duty in the Navy. The WAAC camp is growing every day."

"I have finally found a place where I can help the effort for a few weeks. I am doing some extra emergency work in the post engineer's office, and I'm very glad to feel I'm able to spend some time on things of importance. The miniature furniture is an interesting hobby and I'm enclosing some photos of other pieces I have made. . . ."

"My son has been sent to Santa Ana, Calif. He will have a month's intensive work in a school for special training of Air Force officers and commandants."

"I'm obliged for the help on names of the graduating Class. Strange how the freshman ties were the strongest. I suppose that is because when we landed at school we felt as green as grass and needed to herd together for mutual support and courage. I remember very plainly my emotions the first day I stood at the top of Rogers steps and gazed up and down Boylston Street. Little we knew

what would be happening in 1942 and 1943!" — HENRY A. FISKE, *Secretary*, care of Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I.

## 1892

The portrait of Horace S. Ford has been hung in the reception room of the President's Office, the headquarters of the Corporation. That is a most appropriate place. This gift of the Class is valued highly by the Institute.

Dr. Severance Burrage writes from Denver, Colo., that he had some very pleasant meetings with George Rowell in Denver last summer. He wrote: "George is the only classmate I have seen since the 45th reunion." Burrage is the only member of our Class who lives in that region.

Channing M. Wells of Southbridge, Mass., has been spending the winter season at Palm Springs, Calif. He and Mrs. Wells expect to return east in April. They will spend the summer at their residence at Wianno on Cape Cod. Wells has three sons in the Army and Navy, and a fourth son in Washington.

W. S. Hutchinson is active again, and he comes into the Institute frequently. — CHARLES F. PARK, *Secretary*, Room 5-111, M.I.T., Cambridge, Mass.

## 1893

William Wood Carter, formerly of Great Plain Avenue, Needham, Mass., died at Miami, Fla., on March 2. For several years he had spent his winters in Miami. Carter was graduated with the Class in Chemical Engineering and with the Class of '94 in Electrical Engineering.

In 1898, Carter came to Needham and established the Greendale Chemical and Electric Light Company, which he operated for five years until the lighting plant was sold to the Edison Electric Illuminating Company of Boston. From 1903 to 1914, when the plant was closed by the War, Carter was president and half owner of Newton Company, Watertown, Mass., operating a by-product wheat-starch process which he had perfected. From 1918 onward he was in consulting chemical engineering practice, with a laboratory at Needham, and was president of the Chemical Process Company and of Industrial and Research Laboratories and engineer of the Colasta Company, all of Boston. He took out several patents on waterproofing leatherboard, fiberboard, and other paper products, and also on the synthetic insulating resin, "Colasta." For many years he was a technical adviser at M.I.T.

Edward S. Sanderson of Waterbury, Conn., died on February 13 after a long illness. Sanderson was with the Class during our freshman year only. He then went to Cornell where he received his mechanical engineering degree in 1894. After 1894, he worked as apprentice and draftsman with the Hendrick Manufacturing Company of Carbondale, Pa., and early in 1895 went to the Illinois Steel Company, Joliet, Ill., where he remained until 1898, holding positions of assistant chemist, assistant metallurgist and night

1893 Continued

superintendent of the plant. In 1898, he went to Philadelphia as superintendent of the Pennsylvania Globe Gas Light Company and later was superintendent of the Kitson Light Company as well. In 1903 he began his long connection with the Scovill Manufacturing Company of Waterbury, Conn., where he rose through various positions to that of general sales manager. Sanderson was married in 1903 to Frederika Catlin. They had one son, Edward.

Jesse B. Baxter has been president of the Blue Hill Bank and Trust Company of Milton, Mass., since 1927. Prior to that date he served for 16 years as vice-president of the bank. Baxter writes: "After leaving Technology, I taught one year and then took a position with the Farben Farbriken of Elberfeld Company, which petered out due to a depression. I was temporarily laid off with the promise of recall. That was about 50 years ago, and if I don't hear from them soon, I am afraid I shall decide to turn the job down."

Henry L. Rice entered the Army in the First World War as a major in the Ordnance Department and was later promoted to lieutenant colonel. He saw service in France. After the War, he accepted a commission as a major in the regular Army and was stationed in the office of Chief of Ordnance in Washington. He was promoted to lieutenant colonel in 1933 and retired in 1936 because of his age. Since his retirement he has lived at Virginia Beach, Va., where he is chairman of the Debt Service Commission and treasurer of the Chamber of Commerce.

For ten years, Rice was general manager of the Western United Gas and Electric Light Company of Illinois. He became a specialist in high-pressure artificial gas engineering and was awarded the Beal Medal of the American Gas Association for scientific work in this line. Then he served for a few years as vice-president and consulting engineer of several public utilities in the Middle West.

Rice writes: "I claim to have been the very first person to have used electricity in an automobile headlight and the first to have developed the gasoline carburetor choke. The first was laughed at; the second I stumbled on while seeking something else which proved successful but too complicated. Not to have realized what I did find and patent same, instead of fussing with and arguing about the impractical thing that included it, cost me some millions which I don't regret. Anyway, most drivers would be better off without the choke."

Harold A. Richmond is board chairman and treasurer of the General Abrasive Company of Niagara Falls, N.Y. He is also treasurer of Lionite Abrasives, Ltd., and of the Crouch Mining Company. He has taken out numerous patents on synthetic abrasives and has been a frequent contributor to scientific and trade journals on the subjects of synthetic abrasives and ball bearings. Among interesting experiences of his lifetime he mentions his reception in Hungary in 1909 as a grandson of Anna Richmond, a

large contributor to Hungarian religious organizations. — Richmond's home address is 625 Buffalo Avenue, Niagara Falls, N.Y.

George Lounsbury Walker for the past 20 years has been mayor of the village of Brightwaters, N.Y. Having been graduated from the College of the City of New York in 1890 with the degree of B.S., Walker joined the Class in our sophomore year and was graduated in Civil Engineering. His life work has been primarily in building construction and in real estate operation. During World War I, he was a captain in the construction division of the Army Quartermaster Corps, and in the present war he is serving as deputy director of civilian defense, Suffolk County, N.Y. Both of his sons are Technology men: George B. Walker '30 and John L. Walker '32.

Cadwallader Washburn writes: "My life since leaving M.I.T. has been very full. My latest adventure was a precipitated escape in a tanker bound for Colombia from the Canary Islands in the summer of 1940. Upon such short notice I had to abandon all my household effects, prints, paintings, and Spanish money. The latter was left in care of the American consulate at Santa Cruz de Tenerife. Since my return from the Islands, I have been in the care of an internist. In October, I was hurried to a hospital for removal of a gangrenous appendix on the point of rupturing. I am thankful to be well again. I shall make an effort to be at the reunion scheduled for June 5. As I think of it, I have never attended one once since leaving M.I.T. I am particularly interested in renewing my acquaintance." — FREDERIC H. FAY, *Secretary*, 11 Beacon Street, Boston, Mass. GEORGE B. GLIDDEN, *Assistant Secretary*, 551 Tremont Street, Boston, Mass.

## 1896

Have you read: "Whan that Aprille with his shoures sote/The droghte of Marche hath perced to the rote/And bathed every veyne in swich licour/Of which vertu engendred is the flour/Whan Zephirus eek with his swete breeth/Inspired hath in every holt and heeth..."

At the time these notes are being written, the last of March, and as far as the members of the Class of '96 are concerned, there ain't been nary an inspire from Zephirus or any other source. Perhaps this would not be entirely unexpected with the New England bunch where cold winter still lingers in the lap of spring and sap has yet to start coursing upward in the *Acer saccharum*, but how about those chronic denizens of the Sunny South like Merrell and von Holst or those peripatetic Florida sojourners (fewer in number this year) like Dan Richardson. Even Arthur Baldwin down in old Virginy, south of Mason and Dixon's line, should have felt the kiss of some swete breeth and have engendered something. All of this is to say that no one has reported any news.

It remains perforce for the Secretaries to divest themselves of their modesty and speak about themselves in order that this column may not be entirely barren.

Rockwell, the Assistant Secretary, made a hasty trip to Harriman, Tenn., March 10 to 14 inclusive, and returned with the report that everything was humming down there. This year, because of the Tennessee Valley Authority development and its effect on flood control, Harriman has not suffered any damage from spring floods.

The Secretary observed Washington's Birthday by contracting a case of shingles, which resulted in several pleasant calls of a professional nature upon Dr. Rockwell for treatment, and also the enjoyment for a period of two weeks of the fine facilities and services of the M.I.T. Infirmary. Since this is located right in the main building of the school, the Secretary slept there and ate there, but was able to come to his office every day to carry on his work. Although the doctor designated it as a beautiful case, it did not cause the Secretary the extreme discomfort which some people suffer with the disease, and at the time these notes are written, the last of March, the Secretary has made slow but definite improvement and expects that in due time he will be back to normal health.

As a postscript to the foregoing, the old reliable Lloyd Wayne has saved the day by coming through with a communication at the very last minute. He has positively identified the man No. 236 on our freshman photograph in the class book, erroneously designated as K. A. Pauly, to be actually W. B. Vose, who was associated with our Class in our freshman year, but who finally became a member of the Class of 1899. Thus that matter is finally settled. At the time he wrote, Lloyd was in the hospital after a little foot operation from which he was recovering very nicely. He seemed unable to justify his continued hospitalization because he had not a single pain or ache, or any fever, and his pulse and bodily functions were absolutely normal. Mentally he had been a trifle upset because of difficulty in getting the nurses to meet his wishes in regard to food, particularly the way his eggs were cooked for breakfast. (Parenthetically, the Secretary can place a feather in the caps of the nurses of the M.I.T. Infirmary for their fine service in meeting every wish the Secretary expressed regarding the amount, nature, and method of cooking of the food he received during his two weeks of internment.) Wayne said Joe Stickney had just been re-elected president of the Indianapolis Athletic Club, a job that Joe has held for at least ten years. He also said that Billy Andrew was just as busy as he could be, having his plant on war work, mostly for the Navy.

Before these notes appear in print, you will all have received an appeal for the Alumni Fund for the year beginning April 1. The standing of the Class of '96 in the Alumni Fund for the past year was nothing to write home about, and your Class Agent, Henry Grush, and the Secretaries hope that each member of the Class will give serious consideration to the new appeal, with the objective of improving our standing.



1896 Continued

A change of address has been received for Robert L. Fuller, who is now at 63 Brattle Street, Worcester, Mass. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

## 1897

The Secretary was very glad to receive the following letter from Jere R. Daniell: "I have an idea that this is the first time I have ever sent in an item of class news. This seems to be as good a time as any to break the ice, for I was married on January 23 to Charlotte Frothingham Brown of Groton, Conn. This made our small but select gathering of three classmates at the Alumni Dinner an especially festive occasion. Charley Breed and Eames did their very best to help me celebrate, but we should have enjoyed a larger gathering.

"This year was also noteworthy for another reason. I graduated my first young protégé in my own special branch of the Naval Architecture Course at Technology. Having no sons of my own, I have established a scholarship for boys at the high school in Franklin, N. H. The scholarship covers tuition at M.I.T. Five young men have now received their degrees on this scholarship, but John Watts, who was just graduated, was the first to be in my own specialty.

"I was terribly sorry to get the sad news of the death of Arthur Hopkins. I knew him better than most of our classmates. He had spent a night or two at my farm in Franklin, N.H.

"My very best regards to you, as always. I shall hope to see you when we have another class reunion. I personally feel that we should have some kind of a get-together this coming summer. Our mortality is getting higher now, and that is another reason for joining up.

"You probably know that for two years I have been helping out in the Course in Naval Architecture and Marine Engineering at M.I.T., taking charge of the intensive courses in naval architecture which are being given under the auspices of the United States Office of Education. Six of these courses have now been completed and a seventh is under way." The Secretary is sure that Jere and Mrs. Daniell have the congratulations and best wishes of every '97 man.

Your Secretary greatly enjoyed meeting Walter Humphreys, Secretary of the M.I.T. Corporation, on the occasion of the award of the Army-Navy "E" pennant to the Arlington Mills at Lawrence, Mass., on March 11. Humphreys, as secretary of the National Association of Wool Manufacturers, was an invited guest. Franklin W. Hobbs '89, II, is president of the Arlington Mills. Walter's son, George C., who was graduated from the Institute in '31, is a lieutenant in the Bureau of Ships, Navy Department, Washington, D. C. He was formerly an engineer with the Buda Company.

Gus Lamb has been heard from at last. He is one of the senior employees of the American Writing Paper Corporation, and is listed as an "eagle-A sales staff

member," with headquarters at Holyoke, Mass. He boasts of three sons. Roland, the oldest, signed up with the Navy; Donald is with the John Hancock Mutual Life Insurance Company in Boston; and Beverly, the youngest, is in Wisconsin studying for the ministry. Gus received his degree in Chemical Engineering but is best remembered for his active interest in the Glee Club. In later years his hobbies were skating and baseball. Now he is content to work about his home and garden in Amherst. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

## 1901

Bob Derby writes that he resigned from the tools division of the War Production Board in February and joined the Office of Foreign Relief and Rehabilitation, where he is special assistant to the director of budget and finance. This is a division of the State Department. After 35 years in the machine-tool business, Bob retired to his farm in Williamstown, Mass., in 1938. Then in 1940 he became engineering consultant to the Secretary of War; in 1941 he was technical adviser to the Indian Purchasing Mission, New York City; and in 1942 he went with the tools division of the W.P.B. He also gives us the news that Mansfield Estabrook has resigned from the tools division of the W.P.B. in Boston because of illness. He has gone to Florida to recuperate.

From Warren Bickford we have received a note which contains the information that the wholesale electrical-supply business of the Iron City Electric Company, which he helped to establish in 1909 and of which he was secretary and treasurer, was sold to the Westinghouse Electric Supply Company in 1939. He became, and still is, district manager at Pittsburgh for the latter company. Warren has two daughters, Mrs. Washington Frazer, Dedham, Mass., and Mrs. David McCargo, Pittsburgh, Pa., and five grandchildren.

R. R. M. Carpenter, Vice-president of E. I. du Pont de Nemours and Company, says that he is giving practically all of his time as chairman of the Delaware chapter of the American Red Cross. Since January 1, John Boyle, Jr., has been a patent attorney in the Office of Alien Property Custodian, division of patent administration, Washington, D.C. — Charles Mace is executive secretary of the Synthetic Organic Chemical Manufacturers Association, New York City. He says the War Production Board, the postwar program, and so on, keep him with his nose to the grindstone.

V. Frank Holmes lives in Swampscott, Mass. He represents the Andale Company of Philadelphia, Pa., and the Dayton-Dowd Company of Quincy, Ill. — Howard Wood is retired and lives in Rockville, Conn. He serves on the local ration board's fuel-oil panel and is a director on several trust-fund boards.

My old neighbor in my home town, Commander Charles Bittinger, United States Naval Reserve, is a *camoufleur* in the Bureau of Ships, Navy Department, Washington, D.C. He writes: "I am still

at the old grind, painting ships so that they will be invisible or so you can't tell which way they are going. The monotony of the swivel chair has been broken by some trips to sea. The longest trip was to Scotland. The fact that only the good die young prevented the submarines from doing their worst."

After serving in the Ordnance Department in several cities in the Midwest, Willard Dow is now supervising auditor in charge of government-owned facilities and the redetermination of contract-unit prices for the Boston Ordnance District. He writes: "After two years in the Midwest, it is delightful to get home to New England again. Electric fans and air conditioning make life possible for a New Englander located in the Mississippi Valley.

"Ed Seaver told me when I met him on the street that he was on his way to Florida to avoid the remainder of the Boston winter. [Ed gave notice of this last year.] He just wanted to watch the sun shine, and to go inside only for his meals."

A clipping from a Florida newspaper in February, was headed by a fine photo of Al Higgins. The item reads: "Pictured above is President A. W. Higgins of the Florida Power Corporation and the Florida Public Service Company who, for the third consecutive year has been general chairman of the St. Petersburg community (and now war) chest campaign. This year's goal was \$99,609. Collections, however, totaled \$105,713.

"Mr. Higgins may be likened unto what militarists call 'striking power'. He has it. Given a community task, he will do it. He approaches problems with a sound engineering mind, insists upon preciseness in planning, first. This love of sharp definitives robs many of its worshippers of human qualities. Not so with 'Hig'. To him, life's challenge will be met by people, not machines. It is primarily for that reason that he was induced, this year, to also head Pinellas county's boy scout organization, a work in which he has long been interested. Mr. Higgins' power domain stretches over a large part of central and west Florida."

Al is located in St. Petersburg, and in addition to being president of the two companies mentioned above is vice-president of the Georgia Power and Light Company. He says these companies are planning to merge into the Florida Power Corporation if the Securities and Exchange Commission permits.

Lammot du Pont, chairman of the board of E. I. du Pont de Nemours and Company, writes as follows: "I sent in my information blank but did not mention a matter which perhaps would be of interest to some members of the Class. I am chairman of the executive committee of the Manufacturing Chemists Association of the United States, 608 Woodward Building, Washington, D.C. This is probably the leading organization in the chemical manufacturing line. I am also regional vice-president of the National Association of Manufacturers, 14 West 49th Street, New York City. If any mem-

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ber of the Class ever has occasion to get in touch with either of these organizations, I should be glad to hear about it and assist him to the very best of my ability."

The following is a letter addressed to Ted Taft from Dan Patch: "I have just received a letter from Honolulu which has a note in it which may interest you if you recall Lyman Bigelow. [Lyman Bigelow's address is Territorial Office Building, Honolulu.] A friend of mine in writing of him says: 'I frequently see him as I go to the city planning meeting Friday afternoon. He is often at the meeting of the public works committee of the board of supervisors which meets earlier than we do but is often still in session when we assemble. . . .'

"Apparently Lyman is returning more to public activities since I saw him in Honolulu in 1938. He had quite a hand in developing public works in our Pacific paradise. I wouldn't be surprised if he could tell some interesting stories about the day of the attack on Pearl Harbor, if the censors would let him."

In forwarding the above letter, Ted Taft says: "I have recently received the enclosed letter from Dan Patch, who associates with '02. Technology is rapidly becoming an armed camp. There are men here from the Army, Navy, and the Marines. All the undergraduate dormitories have been evacuated by the students and taken over by the Army. I expect to be teaching steadily from now through the duration." — GUY C. PETERSON, Secretary, 788 Riverside Drive, New York, N.Y. THEODORE H. TAFT, Assistant Secretary, Room 3-266, M.I.T., Cambridge, Mass.

## 1902

Frank J. Eager, III, passed away on February 27 at Sudbury, Ontario, after a brief illness. At the time of his death he was superintendent of the Frood mine of the International Nickel Company of Canada. Eager had been associated with the mining industry since 1908, and in the Sudbury Basin since 1913. The place which he had made for himself is well stated in the following excerpt from a newspaper article: "The death of Mr. Eager removes one of the noted figures in mining development in the Sudbury Basin, a mining engineer who was mainly responsible for the initial development and success of two of the largest nickel producing mines in the world, Frood and Levack. Intimately linked with the nickel development of Sudbury district since November, 1913, the late Mr. Eager played a leading role in mapping the future of the area. He was recognized as an expert on mine management and was considered to have few peers in this sphere. His unbounded energy, coupled with his wide experience in the mining field, earned him an enviable reputation both as a mine developer and supervisor. An ardent sportsman, he was always enthusiastically behind all sport programs advanced for the enjoyment of the employees under him, and, winter or summer, he seldom missed a sport attraction of any major importance."

Charles E. Locke '96, Alumni Secretary, in a note to the Secretary, writes: "I had the pleasure of making a quick visit to the Frood mine four or five years ago. Frank showed me around, and I enjoyed his fine hospitality. The thing that impressed me particularly was that he was an ideal manager, who kept everything neat and shipshape. The morale of his employees was high, and the organization most efficient. I have often cited it to my classes and others as a model mine."

Mrs. Eager writes that after Frank's last birthday on May 28 they were all prepared to return to the States, where they were looking forward to the prospect of locating in eastern Massachusetts and renewing old acquaintances. Owing to the war, the labor shortage, and other factors, however, he was persuaded by the company to continue on the job, so he died in harness. The daughter, Jane, will be graduated from Smith in May. She has been majoring in mathematics, and she hopes to teach in some place near Boston. The mother and daughter plan to move back to the United States soon.

Dan Patch called up the other day to say that on his way back from Akron, Ohio, where he has been located of late, he stopped off in New York and had the pleasure of lunching at the Technology Club, where he met Jack Fruit and Henry Manley.

In a note from Mrs. Harold O. Bosworth, we learn that her son, Otis, was in Quito, Ecuador, at the time of his father's death on January 31. He had been there since February, 1942, as a counsel for the Office of Coordinator of Inter-American Affairs. He is expected home for a visit soon. The younger son, Richard, is with Denver Fire Clay Company in the export department, while his sister, who was married last year, lives in Cleveland. — In "The Technology Bookshelf" for 1942-1943, we note that two of our classmates are listed. Saylor wrote *Tinkering with Tools*, and Gilbert Townsend, with J. R. Dazell, wrote *How to Plan a House and How to Remodel a House*. — BURTON G. PHILBRICK, Secretary, 246 Stuart Street, Boston, Mass.

## 1903

Eleven of the Class had luncheon together on January 30 at the University Club in Boston. We discussed the question of having a celebration of our 40th anniversary. We decided unanimously that we should not omit our reunion, but that instead of holding it somewhere along the seashore, we should go inland. The matter of details was left to the Secretaries to arrange. Those present at the luncheon were Aldrich, Clark, Cushman, Denham, Gleason, Gould, G. M. Greene, Howard, Jackson, K. D. Jewett, and Whitcomb. Clark, Cushman, Gould, and Greene attended the Alumni Dinner at the Statler in the evening.

Through the courtesy of Edward W. Currie, a personal friend, we have received the following summary of the professional life and activities of Floyd T. Taylor, VI, who died in Matawan, N.J. on January 9: "After his graduation from

Technology in '03, Taylor took a position as engineer with the General Electric Company at its Lynn works. In 1904, he resigned this position to take another in the engineering department of the Cutler Hammer Company in Milwaukee. . . . In 1918, he resigned his position with the Cutler Hammer Company and moved to Matawan, where he became vice-president and general manager of the A.P. Munning Company, later the Hanson-Van Winkle-Munning Company, with plants in Matawan and Anderson, Ind. Taylor remained as vice-president of that company until 1931, when he resigned to accept a position with the Bullard Company in Connecticut. There he was engaged in developing the Bullard Dunn process for cleaning metals. In 1937 he retired and moved to Matawan, where he was living at the time of his death.

"Taylor married Anita Goldsmith of Milwaukee in 1911. They had two children: a son, Floyd T. Taylor, Jr., who is married and is a captain in the Army, stationed at Fort Benning, Ga.; and a daughter, Elizabeth, who is married to Edward A. Norman, Jr. Mr. and Mrs. Norman are now living in Columbus, Ohio. They have one child. Taylor was very active in civic affairs in Matawan. He was serving as president of the Matawan Civic Club at the time of his death."

We have received notice that James M. Gammons, VI, died in St. Petersburg, Fla., on November 2, and that Sheldon K. Baker, XI, died in Phoenix, Ariz., on July 12. We have been unable to get details of Gammon's professional career, and we just learned of Baker's death in late March. We should welcome facts about both of them.

A. A. Potter, VI, dean of engineering at Purdue University, has received the Washington Award for 1943. This award is administered by a commission representing the Western Society of Engineers and four other national engineering societies under a foundation created by John Watson Alvord in 1916. The commission granting the award for 1943 is headed by E. Gordon Fox, chairman, and contains representatives of the five engineering founder societies. The presentation to Dean Potter was made by the President of the Western Society of Engineers at a dinner held in Chicago on February 24. The citation read: "For distinguished leadership in engineering education and research, and patriotic service in mobilizing technical knowledge for victory in war and peace." The Class can well be proud that two of its members have now received the Washington Award. Frank B. Jewett received the honor in 1938.

In February, the Boston *Herald* had an extensive interview with W. R. MacCornack, IV, Dean of Architecture at Technology, in regard to the architectural transformation of Boston at some tomorrow after the war. Airports on roofs, television, individual generation of heat, light, refrigeration, and air conditioning in buildings "which nudge up into the gossamer white, and which sport lawns and gardens in the lap of heaven,"



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are bound to come in place of Boston's architectural ugliness. The article read: "MacCormack was active in the first slum clearing project on a mass scale carried out in Cleveland, Ohio. He outlines a very radical but attractive revamping of Boston's physical face — without destroying its 'hub and wheel' concept of city plan."

We had a pleasant call from Sam Porter's son, who is a petty officer in the Canadian Navy. He tells us his father is now retired but is still busy with mining interests and other things. Sam was with the Canadian Pacific Railway Company for many years. — **FREDERIC A. EUSTIS**, *Secretary*, 131 State Street, Boston, Mass. **JAMES A. CUSHMAN**, *Assistant Secretary*, 441 Stuart Street, Boston, Mass.

## 1905

If some of our home correspondents were as interested in class affairs and class spirit as Walter Bent of London and Harrow on the Hill, the life of your Secretary would be much easier about the 20th of the month, when news for *The Review* is expected. Walter, still with Kodak, Ltd., writes thus: "You ask for news. I am afraid there is not much that I could tell you that you could not read more fully and better in your newspapers. Things are interesting here, however, even if there are certain shortages and inconveniences."

"London is filled with American men in either officers' or privates' uniforms. There are, too, quite a few civilians who have been sent here by the American Government. I have had the privilege of meeting and talking with many of these men, both in the services and out. I have been impressed with the high grade of these men. The American soldiers have behaved themselves extremely well. At least my English friends who are located near their camps say so. Naturally, they are homesick and once in a while some boy celebrates a bit strenuously, but the local English police take a very tolerant view of their exuberance, and the general feeling between the two peoples is excellent."

"With regard to my own family: I think that you already know that one son went with the American Army to North Africa. He is a fighter-pilot officer. We have only received one letter from him. He had been in action several times and seemed to be enjoying himself. My youngest son, just over 18, has been in the United States Army, stationed over here in England, since last November. As he is so young, I doubt whether he will be sent to the front before the end of the year. He seems very enthusiastic about the food that the Army is giving him, as compared with the food that he got at home before he left us. My daughter is in the British Auxiliary women's service, the Auxiliary Territorial Service."

Elmer Wiggins, V, keeps insisting that he is not in Providence but at Camden, Ark., [Box 179 — for mates who wish to write him]. He is doing a swell job of training airmen.

The Class was well represented at the Alumni Dinner in January. Frank Chertman in full social regalia sat at the

head table, and later we discovered the reason. He was introduced as "the next President of the Alumni Association." Thus comes honor to the Class and to Frank. Also at the head table was Julius A. Furer, XIII-A, a rear admiral. At the '05 table were Buff, Strickland, Babcock, Smart, Harvey, Shapira, and your Secretary. The long-distance award went to Harvey, who reciprocated by entertaining at a cocktail party in his room at the Hotel Statler during the afternoon. Besides those mentioned above, Kenway and Marcy "dropped in for a buzz and a sip." Marcy, now with the Boston Woven Hose and Rubber Company, gave us a very sketchy description of the largest rubber bathtub in the world, to be used for oil storage somewhere "behind the lines." Harvey, still "king of aluminum casting," rides the sleepers continually between Chicago, Washington, and the bigger arsenals. Babcock is still with Westinghouse in Boston. Buff and Smart are busy (competitively) making instruments for the various war branches.

Wesley C. Gilman, II, joins the grandfather club. The last we heard he was trying to contact his son, who is in the Army somewhere, to announce the glad tidings. — Roy Allen, III, breaks out with a new address: care of R. P. Scott, Box 387, Morenci, Ariz. This doesn't quite check with his last reported occupation, which was liaison representative between the United States and South America. Maybe Morenci is the airport at the northern end of his journey. — Henry S. Spaulding, XI, died on May 8, 1942. — **FRED W. GOLDTHWAIT**, *Secretary*, 274 Franklin Street, Boston, Mass. **SIDNEY T. STRICKLAND**, *Assistant Secretary*, 137 Newbury Street, Boston, Mass.

## 1907

For Cecil F. Baker we have a new address: 2816 Inverness Place, Cincinnati, Ohio. What this may mean in the way of a new business affiliation, we do not know. — The firm of which Herbert Eisenhart is president, Bausch and Lomb Optical Company, Rochester, N.Y., on February 3 won its third star for the Army-Navy pennant. Each star represents six months of outstanding performance in defense work. The concern is 90 years old and is the principal producer of military optical equipment in the United States. I wrote to Herbert congratulating him on his leadership of this enterprise, and I have for our class records a booklet, "Bausch & Lomb at War," that gives a pictorial representation of some of the record on which the government awards have been based.

Ed Lee and his family have changed their permanent home address from Greenwood, Mass., a suburb of Boston, to 341 Beacon Street, Boston, because of various oil and transportation difficulties, although they plan to live at the Greenwood house during the summer. Ed is a designing engineer with the New England Power Service Company, Boston. — Oscar Starkweather continues to live in Needham, Mass., but his home address has become 155 Chestnut Street.

## THE TECHNOLOGY REVIEW

Bob Rand is now Lieutenant Commander Robert Rand, Room 2W10, Bureau of Aeronautics, Navy Department, Washington, D.C. In response to my letter of early March, he wrote me on March 17 as follows: "I presume you were surprised to learn that I had joined the Navy. I doubt if I shall 'see the world,' as I shall probably be in Washington for the duration, though once you join up you can never be sure of being settled in any one place. I am attached to the Bureau of Aeronautics, but I spend most of my time in the steel division of the War Production Board. With an Army officer, I represent the aircraft resources control office and through them the aircraft scheduling unit, located at Dayton, Ohio. Aircraft production is a joint program of the Army and the Navy, and the two services work very closely on it. Our work here has to do with steel for the aircraft program — requirements, allocations, and shipments. With the Controlled Materials Plan beginning to operate, there are many new questions daily, so we have a busy time keeping up with them. My permanent address is still 75 Federal Street, Boston, as I expect to go back with Bethlehem Steel when the war is over."

This is all the material I can dig up for this issue, fellows. — **BRYANT NICHOLS**, *Secretary*, 23 Leland Road, Whitinsville, Mass. **HAROLD S. WILSON**, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

## 1908

The third dinner meeting of the 1942-1943 season was held on March 16. The following members of the Class were present: Stiles Kedy, Steve Lyon, Henry Sewell, George Freethy, A. S. Cohen, Pop Gerrish, Harold Gurney, George Belcher, Myron Davis, and Nick Carter. Fred Cole and Arthur Skillings had planned to be with us, but at the last moment they found it impossible to come.

All the fellows at the dinner agreed to talk or write to two or three classmates to urge them to attend our 35th reunion on June 18 to 20 at Oyster Harbors. Those coming from a distance can be assured of transportation to and from Oyster Harbors. We hope that by the time you read this, many members of the Class will have sent replies indicating their plans for the reunion. If you haven't replied as yet, please do so right away, as we are anxious to make a report at our next dinner meeting on May 18. This meeting will be held at the University Club, 40 Trinity Place, Boston, at 6:30 p.m. Please let us know if you are coming, so the committee can make their plans. — Linc Mayo, our Treasurer, would like to have more dues sent in.

We hear from Mat Porosky that he is spending about 80 per cent of his time in Moline, Ill., converting a civilian plant to 100 per cent war activity. — Harold S. Osborne, operating results engineer of the American Telephone and Telegraph Company, has been re-elected chairman of the standards council of the American Standards Association.

1908 Continued

The American Society of Civil Engineers has honored the memory of Arthur Sylvester Douglass, who passed away on March 6, 1942, by the publication of a memoir of his life. This memoir has been sent to us for the class records.

We have the following changes of address to report: Monroe Ames, 416 North Geyer Road, Kirkwood, Mo.; Commander Paul H. Fretz, Assistant Industrial Manager's Office, Ferry Building, San Francisco, Calif.; John J. Mullen, Anaconda Copper Company, 514 Hennepy Building, Butte, Mont.; Harry A. Rapelye, 1618 21st Street, Northwest, Washington, D.C.; Colonel Charles M. Steese, United States Army, Office of Combined Chief of Staff, Munitions Assignments Board, 1901 Constitution Avenue, Washington, D.C.; Mrs. John H. Williams, 100 Park Place, Kingston, Pa. — H. LESTON CARTER, *Secretary*, 60 Batterymarch, Boston, Mass.

## 1909

The distinguished fathers of two of our classmates have passed away recently. Professor Davis R. Dewey, father of Brad, died on December 13, and Charles T. Main, father of our late Secretary, died on March 6. It is important not only that these two fathers had become distinguished in their respective fields of endeavor but also that both had exemplary characters and endeared themselves to all who came in contact with them. The Review Secretary met Father Main and his daughter Alice on the occasion of their visit to Bermuda in 1938. Also, on two or three occasions, one only recently, he met and chatted with him at his office while he was taking over the remainder of Charlie's '09 records. At the funeral, where a large number of friends paid tribute, it was recognized that he was a great engineer, but one was most impressed by the testimonials to his character, his integrity, his tolerance, and his interest in church and home. He was a great man in the broadest sense of the word, and he set an example that all of us could well emulate.

In the April Review, Paul in his own vivid manner told some personal reminiscences of Professor Dewey. His recollections about Father Main are of equal interest. He wrote: "In the death of Charles T. Main, father of our classmate and Class Secretary, Charlie Main, we have lost a distinguished and loyal friend. I have a clear picture in my mind of a Technology Clubs Associated meeting at the old Waldorf-Astoria in New York in 1923. That was a memorable occasion for me because I was asked to arrange a class luncheon; it was my first official job in class affairs. I'm sure that Charlie was down from Boston and, since there was no table for the Class of 1876, Charlie's dad sat with us. I think that was the first time I had met Father Main, as I have called him from that day to this. I always talked with him at the five-year reunions. On several occasions I saw him in New York. One very happy time was when he and his daughter, Alice, were embarking for Bermuda. Only last summer I

saw Father Main in Boston. I could not help remarking how fit he was looking. He was 86, but the grasp of his hand and the keen look in his serene and kindly eyes were possessed by few men, even those who were many years his junior. On his 87th birthday, February 16, I sent a note of greeting, as I have done for many years. He acknowledged it in a letter that I shall cherish. The good, bold, strong signature was that of a man of noble spirit and of unusual physical strength.

"Art Shaw and Chet Dawes attended the funeral as the official representatives of the Class, and flowers were sent in the name of the Class.

"The other day came a letter from Mrs. Mildred Lawton, who was Charlie's secretary for many years. She prepared copy for countless issues of The Review and is a devoted friend of the Class. Much that she says must be shared with you who read these notes. Her letter is a remarkable tribute to a distinguished man."

Mrs. Lawton wrote: "What a man above men Mr. Main was, so forthright and forceful, and at the same time completely unimpressed by his brilliant qualities and achievements. I can appreciate how you will feel, having known him so well. When the memorial reprint is sent out, you will receive one. Mr. Main's picture will doubtless be reproduced on it. . . .

"Mr. Main's life came to a close at a time when his particular interests seemed to have reached significant completion. In December, the fiftieth anniversary of his professional life brought him a flood of congratulatory messages, many of which he acknowledged in his own hand. That was the event toward which he had been looking for many months. At the corporation meeting of Charles T. Main, Inc. in late January, he presented a paper summing up 'Seeds That Are Sown—Crops That Are Gathered,' as he had sown them in the earlier years with the manifold return in the growth of his organization. The paper was beautifully presented and impressed all who were privileged to hear or read it. It included a message to his associates with a note of finality, which must have seemed intuitive to those with a sensitive ear.

"Although the Technology Alumni Dinner occurred on a very stormy night, Mr. Main attended it and saw many of his friends. He attended an affair at his church in Winchester a short time ago, when the last bond of a very large expansion program was paid off. This had particular significance as he had been chairman of the building committee and in that capacity had carried the program through in a masterly manner.

"Then came his 87th birthday, which gave his many friends another opportunity to congratulate him, as you well know, and naturally he was made happy by these felicitations. Through it all he seemed entirely his fine self, vigorous and entertaining, always dispensing cheer and inspiration, holding to his program of coming to the office three days a week. Kind fate gave him his wish—that he could go through to the end

unfeebled and with nothing left unfinished. . . ."

Rose F. (Mrs. Charles R.) Main wrote to Paul as follows: "Alice, Ted [16], and the others members of the Main family desire to thank the Class of 1909 for the spray of beautiful calla lilies which they so kindly sent for father's services. Father greatly appreciated the friendly greetings of the members of the Class who so kindly went to his table to speak to him at the last Alumni Dinner."

Ed Howe, VI, who went to South America shortly after graduation, returned to this country a few years ago and went to work with Hardy Cook at the Consolidated Edison Company. He is now with the Federal Power Commission and wrote as follows: "Until recently I have been in the South with the Federal Power Commission, with headquarters at its Atlanta regional office, whose administrator is William A. Liddell '16, who used to be an instructor in the Civil Engineering Department at M.I.T. Work there gave me a great insight into the work and life of southeastern United States because I had to travel about in that region. Twice I was privileged to attend Technology luncheons in Atlanta. All in all, however, there was no objection on my part when the Federal Power Commission transferred me to its New York regional office. All this is war work, and I am on a leave of absence for the duration from the Consolidated Edison Company of New York. Beside my boss and those at the Technology luncheons, the only M.I.T. man I met in the South was the esteemed President of the American Institute of Electrical Engineers, Harold Osborne '08."

Bob Doane, VI, now in Washington, has a son Duncan, who is in the Army handling radio equipment. Bob wrote: "My own work in the Navy is quite burdensome, but we are accomplishing things which I may not talk about. There is no objection to saying, however, that we have a little group of four of us, who are actually procuring all the electric cables used in shipbuilding and taking the brunt of all kinds of questions which come up about design, tests, and whatnot. Beginning soon, every shipyard in the country, public or private, will be prohibited from placing any orders for cables which do not go through our hands for allocation to the many manufacturers. We have about 20 plants to keep loaded and equally loaded for maximum production. As one of the men put it, from now on there is going to be just one purchasing company and one manufacturer, and we are both. The 20 plants are just branches as far as we are concerned, and the plan is working out well. In some ways we know more about what those plants can do than the men running them, for we have a wider perspective."

G. A. Joslin, III, 311 Financial Center Building, 704 South Spring Street, Los Angeles, Calif., was recently appointed consultant for the Metals Reserve Company, which has Los Angeles offices at Room 316, Pacific Mutual Building. Joslin has announced that he intends to con-



1909 Continued

continue his private practice as a consulting mining engineer.

As far as we know, Bill Jones, II, and Clark S. Robinson, X, are the only two '09 men who are professors at the Institute. Bobby is now a lieutenant colonel in the Ordnance Department and is so busy with Army work and traveling between Boston and Chicago that the Institute sees little of him just now. He wrote: "I am wandering around the country at the rate of 2,000 miles per week, functioning as an itinerant schoolteacher. To be more specific, I spend two days a week in Chicago teaching Ordnance Department people how to make explosives without blowing themselves up in the process, and then I come back to M.I.T. to try to teach thermodynamics in a sufficiently explosive manner to keep the class awake. And en route I stop off at the office and try to behave like an ordnance officer. I run into M.I.T. people everywhere, but curiously enough, hardly ever an '09 man. I suppose that on a percentage basis, and according to the theory of probability, I shouldn't expect to do so. But I live in hope. My family is scattered all over the map, being mostly engaged in furthering the public welfare in one way or another. My waistline is still four inches smaller than my chest, and I have most of my original hair and teeth. And I can still get by an Army physical after a fashion. I was glad to hear from Wiswall and Jones."

In the January Review we reported that Ken May, VI, was vice-president of Arthur Perry and Company of Boston, investment bankers. For the time being he has become regional manager for the Victory Fund Committee at Lawrence, Mass. He wrote as follows: "I received your postal card about the Alumni Banquet but was unable to attend. I have been very busy working with the Victory Fund Committee, as regional manager for regions 5 and 6, which together comprise all of Essex County plus Lowell, which is in Middlesex County. The population of these two regions aggregates about 640,000, or nearly 15 per cent of the population of the entire state. The opportunity to help out in this work came to me very suddenly two days before Thanksgiving, and I started in on November 27. I am on leave of absence from Arthur Perry and Company, Inc., for the duration, but I am still a vice-president and director. As I intimated to you, my activities on the buying end of the business had been very much curtailed due to drying up of corporate financing, and so this seemed to provide a means for really being busy as well as for doing something for the war effort. The December campaign was, as you know, a successful drive, and in the April campaign we tried to raise about \$13,000,000. I have a great deal of territory to cover and many volunteer workers to see, so all in all I have little spare time. I am still living in Newton Highlands, although I maintain an office here in Lawrence. Have to use my car a great deal to reach the various communities, as my area extends from Saugus to Amesbury and from Rockport to Pepperell."

At our 25th reunion at Oyster Harbors in '34, Horace Ford was our guest as senior faculty representative. We can anticipate a similar pleasant experience in '44, for Horace wrote to Paul as follows: "I appreciate very much your letter of February 11. I am not at all worried about your being retired. I am sure that you have plenty of interests and plenty to do. Your letter gives me assurance in that regard. I am just back from the Middle West, where I have been participating in a conference which will probably lead to a part in the negotiations that are soon to be country-wide between Army, Navy, and Air Force services and educational institutions with regard to basic advance training for servicemen who are qualified and who would otherwise be outside the college fold entirely. The call is for speed, and as a result, I rather expect that I am going to be gasping for breath before the month is up. But satisfaction comes from working with so many pleasant people here and from getting letters from people who have been here, like yourself. Long life to you, and please save me an invitation for that 35th reunion project."

The Review Secretary announces the engagement of his daughter, Jane Goodwin Dawes, to Lieutenant John Harold McClelland, son of Mrs. Harold V. McClelland of Catskill, N.Y. Jane is a graduate of Abbot Academy and Wellesley College, class of '39, where she was a member of Alpha Kappa Chi. Lieutenant McClelland is in the Army Signal Corps and was graduated in electrical engineering from Cornell University, where he was a member of Zeta Psi and Tau Beta Pi. He was in England for 10 months operating radio apparatus for detecting hostile airplanes and is now detailed on radio work at Spokane, Wash.

Every man to his own hobby! Maybe some day we'll all tell of our hobbies. We know that Leon Healy is a distinguished sailor on Lake Michigan. Ed Ryerson presides over the Chicago Orchestra Corporation. Dale Ellis is a commodore in his own right at his yacht club at Port Washington. And here is Reg Jones farming on the slope of a beautiful hill in Western Jersey. His hobby there is raising stately and tophlofty Brahma fowl, those imposing white boys with black penciling on the feathers of their necks and tails. How they strut! Reg is making a wide reputation with poultry fanciers. He calls his farm "Aldimar," combining part of his own name with that of his wife, Marion. What is your hobby? Ye Secretaries would like to know. — PAUL M. WISWALL, Secretary, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, Review Secretary, Pierce Hall, Harvard University, Cambridge, Mass. Assistant Secretaries: MAURICE R. SCHARFF, 235 Second Street, Southeast, Washington, D.C.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

#### 1911

"K-K-K-Kenney, General Kenney, You're the Nineteen El-El-El-El-evenner of the Day!" might well be our version of the World War I classic. The cover of *Life*

for March 22 certainly seemed ready to talk to you, so natural was it, with its caption "Victor of Bismarck Sea." How we all thrilled in early March when we read of that convoy destruction off New Guinea in which the Japs lost 10 warships, 12 transports, 15,000 men, and 95 planes, and in which we lost only 4 planes, for the Allied commander was George Kenney. As *Life* says: "Lieut. General George C. Kenney at 53 is commander of Allied Air Forces in the Southwest Pacific and commander, Fifth U. S. Air Force. One of the great aerial tacticians of the war. . . ." *Time* for March 15 had an interesting story on Kenney, with an accompanying picture. Look up both articles if you missed them.

Thanks to Minot Dennett, II, of Detroit, I received a copy of the February issue of *The Review* published monthly by the American Society for Metals, in which appeared a fine picture and a tribute to Marc Grossmann, III, who as we told you in the March Review was this year awarded the Robert W. Hunt Award of the American Institute of Mining and Metallurgical Engineers for his paper on "Hardenability Calculated from Chemical Composition." The journal wrote: "Graduate of M.I.T., Ph. D. from Harvard, Dr. Grossmann has been working with alloy steels for most of his professional career, at the laboratories of the Vanadium Corporation of America, Electric Alloy Steel Co., United Alloy Steel Corporation and Central Alloy Steel Corporation. Since 1935 he has been director of research for Carnegie-Illinois in Chicago."

"Technical metallurgy marches on in Detroit, gasoline rationing, public transportation difficulties and food problems to the contrary notwithstanding. It may be the Detroit A.S.M. members are determined to keep up, metallurgically speaking, war conditions or not. It is even more probable that Marc Grossmann's talk on hardenability calculations has sufficient attractiveness in itself to cause more than 300 members to hurdle the war barriers and hear the justly famous lecture. . . ." We're proud of you, Aurora Borealis!

Ed Woodward, VI, western mechanical editor of *Railway Age*, recently wrote the following from Chicago: "On March 18, I had the pleasure, as a member of a large inspection party, of going through the Gary works of the Carnegie-Illinois Steel Corporation, the United States Steel subsidiary which is the world's largest integrated steel mill and has a steel output in this one plant almost equal to that of the entire steel industry of Japan and nearly twice that of Italy. The trip was most informative, stimulating, and encouraging to me, and would be to anyone vitally interested in seeing America win this war."

"Not the least surprising and pleasurable feature of the trip occurred when I recognized another member of the inspection party as a classmate. I couldn't recall his name but lost no time in renewing his acquaintance. He was M. A. Grossmann, metallurgist of note and now director of research of Carnegie-Illinois in this terri-

1911 Continued

tory. Needless to say, Marcus and I are arranging to spend some time together in the near future as we have a number of interests in common."

At a dinner concluding a one-day wartime conference of Massachusetts bankers at Northeastern University in early March, the principal speaker was our Carl S. Ell, President of the university. "If there is any group of our society," said Carl, "that gives a living example of faith, it is the bankers." He said bankers accept the money of depositors for safekeeping with the faith that they can make it pay its board and that they will be able to return it safely to the owners on demand. "The banks hold tons of government bonds," he concluded, "and have faith that the government will keep its promises. Bankers and others live by faith in the future."

Wasn't it a thrill to learn that I. W. Wilson, XIV, Smoky City aluminum tycoon, was nominated to fill the unexpired term of Alfred Shoellkopf '15 on the M.I.T. Corporation!

C. Phillips Kerr, II, a lieutenant colonel, has been transferred from Washington to the Naval War College at Newport, R.I. In the Office of the Assistant Secretary of War in Washington is Sidney P. Spalding, III, recently upped from brigadier general to major general. We have a clipping from a recent issue of the *Miami Herald*, in which R. H. Ranger, VIII, a lieutenant colonel, is listed as one of "a group of prominent American scientists visiting Miami's sub-chaser training station to make an inspection of technical equipment used by the Gulf Sea frontier in anti-submarine warfare."

During a recent business trip to Manchester, N.H., I had a grand renewal of acquaintance with John Urquhart, XI, general manager, and Harold Smith, II, mechanical superintendent, at the plant of the International Shoe Company. John entertained me at lunch, and did we discuss old days on Newbury Street!

Burleigh Cheney, II, salvage manager of the War Production Board for New England, crashed the Boston *Herald* with a picture in mid-March, when he announced that he was recommending Rhode Island's experimental use of prison labor to all other New England states as a practical way of overcoming labor bottlenecks in scrap handling. "Iron and steel scrap," Burleigh said, "must be shipped to the mills and prepared tin cans to the detinning establishments. The materials must be loaded to transport them, and labor must be had to do the loading. Where there is no other labor available, prison labor must be used."

I had the following nice letter recently from A. T. Cushing, I, 329 United States Courts Building, Kansas City, Mo.: "I was in Knoxville, Tenn., recently, appraising stockyards as usual, and I happened to think of the fact that Ted Parker, I, is with the Tennessee Valley Authority, with headquarters in Knoxville. I found Ted's name and address in the telephone directory, and that Sunday afternoon, unannounced, I stepped up to his door. We had a nice visit. He appeared

as glad to see me as I was to see him. We gave each other our personal histories since 1911, and then we found out something about each other's family — all in all a very pleasant afternoon. Ted is looking fine and is busy doing a good job well."

Just after spring came, we learned from an item in the Providence *Journal* that Chet Morey, II, special assistant to the general manager of the Rheem Manufacturing Company at the Field Point shipyard, where he had been unassigned since the Walsh-Kaiser organization took over the yard, has resigned and will conduct apprentice-training courses throughout New England for the Federal government. "Morey is a past president of the Associated Industries of R.I.," the article concluded, "and resides in Rumford."

Here are a few address changes which we received from the Register of Former Students: Henry C. Frisbie, I, H. C. Frisbie Company, 2438 East 55th Street, Los Angeles, Calif.; Theodorus Polhemus, XI, Central Iron Ore Corporation, Woodstock, Ala.; Oliver D. Powell, XI, 211 North Hoopes Avenue, Auburn, N.Y.; Lieutenant Colonel Carl G. Richmond, I, 5417 Mohican Road, Friendship Station, D.C.; H. Rossiter Snyder, IV, Noank, Conn.; and Donald W. Southgate, 620 Nashville Trust Building, Nashville, Tenn.

We're off on Alumni Fund IV. If you haven't yet sent in your subscription, remember there's no time like the present! —ORVILLE B. DENISON, *Secretary*, 82 Elm Street, Worcester, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

## 1914

With a long record of service already behind him in civic and trade-association activities, Norman MacLeod has added another to his numerous laurels. Governor McGrath has appointed Mac as industry's representative on a three-man appeal board on the governor's recent order regarding the length of a work week in the state of Rhode Island. The other two members are a representative of labor and a judge of the Superior Court representing the state.

As one of the Class's regular representatives in the field of new patents, Phil Currier, who is with the General Electric Company in Schenectady, has added another. This one deals with an electrical regulating device.

On March 18, while in Washington on one of his regular trips, your Secretary telephoned Alden Waitt, only to find that he was at Linden, N.J., awarding an Army-Navy "E" to Ross Dickson's company, the Standard Oil Development Company. In his address of award, Alden warned the American public to beware of a smug attitude toward the war. He said that before spring is over, the casualty lists will appall us, and by then we shall begin to realize the seriousness of this war. To date, he said, we have hardly been hurt, but soon we shall realize that war must become a way of life for all of

us. General Waitt said: "This is the worst fight we have been in, and if we bend over to tie our shoelace, we are cooked."

Alden has literally grown up with the Chemical Warfare Service. In World War I, he was chief gas officer of the 29th Division and was subsequently assigned to headquarters of the Chemical Warfare Service of the American Expeditionary Forces. He has seen service in Hawaii, and is a graduate of the command and general staff school and the Air Corps tactical school. He has been a brigadier general since last September, and his book, *Gas Warfare*, is the most popularly read book on this subject.

On this same trip, your Secretary had a chat with Frank Ahern, who is with the Department of the Interior. Frank is still very active in the government service, studying ways and means of reducing fire losses. In connection with his work for the National Park Service, Frank has prepared a 60-page handbook entitled "Prevention and Control of Fire Losses," which is being distributed through the Government Printing Office. He is also delivering lectures on fire prevention at George Washington University, and is president of the Washington Safety Society.

The Class of 1913 set an example that we can well look up to. Their 30th reunion was last January. Because of the war, they limited their activities to a single day in Cambridge. Like 1914, they were graduated in the period just before graduation or 25-year gifts were established. To make up for this, they established the record of being the first Class graduated since 1900 to meet the Alumni Fund quota 100 per cent both as to number of contributors and total dollars. Could '14 do better than to exceed this record? What does it mean: Just 25 more persons to contribute this year than for last year, and \$1,500 more. Our average contribution should be about \$25. Can we not make it at least this once? You bet we can! You will hear more about this from Ross Dickson soon. — H. B. RICHMOND, *Secretary*, General Radio Company, 30 State Street, Cambridge, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York, N.Y.

## 1915

This is a special Philadelphia edition of the column, for recently in Philadelphia I had lunch at the Engineers Club with Herb Anderson, Larry Bailey, Henry Daley, Sol Schneider, and Ed Whiting. This was a real reunion, but we missed the other local fellows who had planned to come but because of war work could not make it. Grev Haslam phoned us at the club to send the readers to these notes his best regards.

Herb Anderson is vice-president of the Technology Club of Philadelphia, an office which seems to remain with '15 for Henry Daley had the position formerly. Herb's company, the Fidelity Machine Company, was recently awarded the Army and Navy "E." The party was enlivened by the presence of WAVES,



1915 Continued

WAACs, and the Women's Marine Reserves, and it is a question how Herb divided honors equally as to who received his special attention. His stirring address and leading of the singing was the outstanding feature of the program. He still lives out in the country with his menagerie and his wife, but despite this he does not use his car to drive to work. We may have to turn to him for a meat supply if rationing gets tough. His son, Peter, was graduated from Harvard in 1943 and is now in the Marine Corps, stationed at Parris Island, S.C.

Larry Bailey as treasurer of the F. J. Stokes Machine Company is busy on war work. His son, Robert E., who received a master's degree at Technology in 1942, is now married and is a meteorologist with the Pan American-Grace Airways in Buenos Aires. — Henry Daley, as bald and as smiling as ever, is still busy with the B. F. Sturtevant Company. His oldest boy, Henry Jr., will be graduated from Pennsylvania State in May, and is an ensign in the Navy, stationed at the college. His next son, Tom, is a sophomore at Pennsylvania State. He is in the Army Enlisted Reserve and expects to be called for service this spring.

Sol Schneider is a chemist at the Philadelphia Navy Yard. His daughter Janet, 20, is waiting to be called into the WAVES. Sol still has that same head of black hair and doesn't seem to have changed a bit. — Ed Whiting is with the Westinghouse Electric and Manufacturing Company. His oldest boy, Bill, was graduated from Wesleyan University and from the Harvard School of Business Administration. He is an ensign in Navy Ordnance, stationed at Fort Schuyler, Bronx, New York City. His daughter, Marion, is president of the student body at Skidmore. His son, Dick, is a sophomore at Lower Marion High School in Philadelphia, where he plays on the football team and on the all-state champion basketball team. His youngest daughter, Joan, is a sophomore in the same high school and plays on the girls' championship basketball team.

Living back over the years, discussing the present, and guessing about the future with these fine old friends made a very pleasant and sentimental meeting.

John Dalton, chief chemist at the Pacific Mills, Lawrence, Mass., recently spoke in Montreal at the annual meeting of the Canadian Association of Textile Chemists and Colorists. John is a national councilor of the American association. He and Lucius Bigelow are unusually close friends of years standing. John corresponds with Lucius regularly and sees him once in a while. Lucius has been immersed in special work on fluorine for the Navy but is very secret about it. John recently reunited with Frank Scully, whom he met in a New York hotel. Weare Howlett and Allen Abrams also recently met under similar unexpected conditions and had a time of it swapping grievances about their experiences in Washington.

You fellows who go to Washington on war work shouldn't neglect George

Rooney there. Be sure to look up the old corsair. He is in the Rubber Director's Office, Municipal Building, Indiana Avenue. The phone number is Republic 7500, Extension 76377.

Henry E. Rossell, a retired Navy commander, has been named president and general manager of the Cramp Shipbuilding Company, Philadelphia, assuming his new duties April 1. Best wishes for success to the commander.

Among the many new changes of addresses are two we should like to check up on. Alfred H. Clarke, for many years with the Bemis Brothers Bag Company in Omaha, is now with the Indianapolis Bleaching Company, Indianapolis, Ind. Wayne Bradley has moved to 1005 20th Street, South Bend, Ind. If these two chaps would drop us a note about themselves, it would make interesting reading.

The 1943-1944 Alumni Fund began on April 1. I am looking forward to the same old '15 spirit to put us over 100 per cent. Always a good giver in the past, Ralph Hart has sent the first '15 check, upping last year's contribution 25 per cent. This was followed closely by Speed Swift's usual generous check. With these fine examples, let your lights so shine to "help Azel." — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline, Mass.

### 1916

Henry Shepard, now a lieutenant commander in the Naval Reserve, turned up in New Haven on February 24 for a war production conference. The local newspaper carried his picture along with those of other celebrities.

Jeff Gfroerer writes that his "Sound Scriber" is doing well and that the United States Navy is his best customer. Classmates using this new device for dictation or for reporting conferences will do well to remember that this is a product of a New Haven firm headed by Jeff.

Walt Binger, custodian of autobiographies, has a fair number of these, sent in largely by classmates who attended our 25th reunion at Oyster Harbors. Your Secretary would be interested in hearing from classmates as to whether or not these should be multigraphed and distributed at a nominal cost, or whether the entire project should be held over until our 30th reunion. Suggestions and comments will be very much appreciated. — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Coleman Brothers Corporation, 245 State Street, Boston, Mass.

### 1917

Your Secretary on a recent trip to Washington saw Bill Eddy, who had just returned from Hawaii, where he had flown to give some information on a sanitary engineering matter. He reported that his trips to Bermuda are now less frequent, but he is still traveling extensively. — Ed Hutchinson has become interested in the Boston district, in the matter of redwood bark for emergency uses. The fiber is now being incorporated with cotton, and occa-

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sionally even wool, for mattresses and blankets.

A photograph from the *Rocky Mountain News* of Denver shows Captain Joseph B. Wirt, who is attached to the operations division of the Rocky Mountain Arsenal, greeting his son, Lieutenant Robert E. Wirt, a navigation officer attached to the Army Air Base of Salina, Kansas. — Nig Sewall reports that he is tremendously busy in the war products division of Oneida, Ltd. There have been difficulties in converting the old-time silver buffers into automatic machine operators, but the change-over has now been completed. — Lin Noyes has been spending some time in Washington in connection with the activities of the advertising committee of the Associated Press. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

### 1918

Here is the answer to Ken Reid's question about Walter Biggar: He is now Captain Walter T. Biggar of the Coast Artillery. — Jack Hanley told us about Bob Collier being in the Petroleum Administrator's office in Washington. Bob has resigned his position there, as the six months' period that he had agreed to serve was over. He has now returned to California and will resume his duties as vice-president in charge of the western activities of the Great Lakes Carbon Corporation. The following comment was made on the resignation by the deputy petroleum administrator: "It is with distinct regret that we accept Mr. Collier's request to be permitted to return to his organization. I am certain that his efforts in behalf of the war program will continue to be as effective in private industry as they were during his tenure as director of marketing."

Under date of March 6 from Washington comes the news that Theodore P. Wright is now the key figure in aircraft production. A War Production Board directive on that date makes official his authority over man power, materials, and tools. The Army and Navy both seem to feel that his choice for this position is a happy one.

Here's another one for the service list: Jimmy McClellan is now a lieutenant. I haven't the least idea what branch of the service he is in, but as he is a Course V man, it may be the Chemical Warfare Service. Let us know, Jimmy, what you are up to these days. We had hoped to see you at the Alumni Dinner in January, but no such luck.

By the time you read this, the first notice of the reunion in Weekapaug in June will be in your hands. If you haven't already sent in the return post card, please do so now, so that we can make our plans accordingly. Not until after the notice was printed and ready to go out did we discover that no mention had been made that the wives are invited — not only invited but expected — at this reunion. Some of the boys have been asking about bringing their children also. They would

most certainly be welcome, and there would be as much of interest for them as for the older folks. Do come if you possibly can for the full time, or for only part of the time, if that has to be. — GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

## 1919

The questionnaires with snapshots and bonds have been rolling in this month with a very good start for our plans for the 25-year reunion. If you have not filled out your questionnaire and mailed your snapshot and bond, kindly do so at once. Bonds should be made out to "Massachusetts Institute of Technology, A Corporation, Class 1919 Fund, Cambridge, Mass."

Alan G. Richards called at the office on March 11 and presented his questionnaire, snapshot, and bond. We had lunch together and had a good chance to talk over M.I.T. and class affairs. Al is associated with the synthetic rubber program for the Dewey and Almy Chemical Company. Since he has returned to Boston, he has written me regarding a follow-up on a number of the '19 men in Boston, all of whom have promised to send in their questionnaire, photos, and bonds. Al was present at the Alumni Dinner in Boston. Other '19 men at this dinner were George McCreery, Hy Selya, Professor Svenson, Harold C. Moberg, and J. Herbert Gould, Jr. Al Richards' two girls are both through college. One received an A.B. from Radcliffe in 1940, and the other an A.M. at the State University of Iowa in 1942.

John Stevens, Jr., Vice-president of the Marathon Paper Mills Company, Rothschild, Wis., came through with not only his questionnaire and snapshot but also two Series F bonds. John has been with the Marathon Paper Mills Company since 1929. He is now vice-president in charge of the timber, lumber, pulp, and paper divisions. He resides at 918 Fulton Street, Wausau, Wis.

David Sanford, Jr., High Ridge Road, Route 62, Stamford, Conn., is now production investigator for the war industry, Yale and Towne Manufacturing Company. Dave has two youngsters: David C., 3d, 14 years old, and Timothy Fox, eight years old. — W. C. Patterson, Box 349, Waltham, Mass., who goes by the name "Archie Tech," had a poem printed in the Ruth Brooks column of the Boston *Herald*.

Word has reached us that Henry S. Derby has been promoted from the rank of major to that of lieutenant colonel, and that Frederick R. Hewes has been promoted from commander to captain.

Cutter Davis dropped in on March 4 on his way through the city. He is busy in upstate New York making gears, speed reducers, and so on, for furnaces, conveyers, and heat-treating equipment — all in connection with the war effort. Recently Cutter saw Ed Farrand, who is with the United Conveyor Corporation, Chicago. — Harold F. Marshall, a major in the Air Corps, writes in that he is busy at Wright Field in the production

division, production control section. — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York, N.Y. GEORGE W. MCCREERY, *Assistant Secretary*, 131 Clarendon Street, Boston, Mass.

## 1920

I most sorrowfully report the tragic death of Joseph P. Lawler on February 15. He was found dead at the entrance of the Peoples Hospital in Syracuse, having succumbed from exposure to the extreme cold. Suffering from the cold, Lawler had endeavored to reach the hospital but collapsed and was not found for several hours. He was a lifelong Syracuse resident and was purchasing agent for the Lummus Company.

Just received a welcome note from Chuck Reed, who reports that his son, Edwin, is a freshman at the Institute. He is enlisted in the Naval Reserve, Class V-1. Chuck, who is head of the Forbes Varnish Company in Cleveland, says they are busily engaged in war work. He doesn't see many classmates but does see Monroe Shakespeare, who visits Cleveland occasionally. He tried to see K. B. White when he was in New York but missed him last trip. Chuck wants to be remembered to all the boys.

Clyde Hall has been promoted to captain and is at the Army Air Base in Romulus, Mich. Claude Kell is a captain in the Navy, supervising shipbuilding for the Bethlehem Steel Company, San Francisco. Arthur Morley has left Granite City, Ill., and is now in Semmes, Ala. Ed Sullivan, I, is a lieutenant colonel with the United States Public Health Service in New Orleans. Art Williams is at 2306 Burwyn Street, Chicago. Dean Willey is at 2 Livingston Street, New Haven. Professor Bob Sumwalt's address is 733 Sweetbriar Road, Heathwood, Columbia, S.C. Joe Margolis now resides at 505 Chestnut Hill Avenue, Brookline. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

## 1921

Once again comes the annual call to support Technology by investing in the Alumni Fund. To you readers of The Review, it is hardly necessary to elaborate on the investment, since you are now reaping its benefits. Suffice it to say that the per capita amount is \$15. Please make yours more to compensate for those who neglect to heed the call. Of this amount, one-third pays for your subscription to The Review and goes toward Alumni Association activities for local clubs, reunions, and the many varied alumni projects in which a large number of you take an active part. The balance of the amount is your share in continuing the building of Technology. Right now that means a direct contribution to our most important job — winning the war. Get that card out from the bottom of the correspondence pile and return it to Cambridge with a generous check now.

Palmer Scott, XIII, President of Palmer Scott and Company, New Bedford, Mass., is receiving congratulations on his com-

pany's winning an Army-Navy "E" award for excellence in ship construction. — Lawrence W. Conant, XV, has been transferred from the Social Security Board to the Adjutant General's Office, Washington, D.C. Larry was Washington's "ideal father" in last year's newspaper review. — A. D. Harvey, III, is in charge of the war production division of Kimberly-Clark Corporation. Dan is located in Neenah, Wis.

Dugald C. Jackson, Jr., VI-A, a lieutenant colonel of Ordnance, reports that Dugald C., 3d, '40, an ensign, has been ordered to Annapolis for a postgraduate course in naval architecture. Dugie's second son, David, was graduated from Yale in electrical engineering last December and is now an ensign in the Naval Reserve, assigned to engineering duty in the Bureau of Ordnance.

John D. Crecca, XIII-A, a captain in the Bureau of Construction and Repair, is now the chief planning officer of an eastern shipyard. The loss of the aircraft carrier *Lexington* was a particularly hard blow to John, who had an important part in the construction of the ship. John is married and has one daughter who attends school at St. Mary-of-the-Woods, Ind.

John W. Barriger, 3d, XV, has resigned as associate director of the Office of Defense Transportation and also as Federal manager of the Toledo, Peoria and Western Railroad. He is now vice-president of the Union Stock Yard and Transit Company of Chicago, 1305 First National Bank Building. John writes that his wife and four children will remain in Washington until the end of the school year.

David O. Woodbury, VI-A, is in his usual beehive of activity, with the buzzing centered at his Tuckahoe, N.Y., address of 1273 California Road. Dave has written a heartening story of young Navy engineers in "Broken Ships Made New," originally featured by the *Scientific American* for December. The article was reprinted by the *Reader's Digest* for March, with the title, "They Get Damaged Warships Back to Sea." A letter from Dave says he recently had lunch with George Chutter, VI-A, whom we put on Dave's trail for a sleuthing mission after a session with Dugie Jackson. Neither George nor Dave has reported on our main question, and we have given up all hope of answering Dugie for the duration. Dave did tell us that *Collier's* has asked him to start a weekly column on "Your Life Tomorrow," outlining what things will be like after the war. Also, the biography of Elihu Thomson, on which Dave has been working for the past year and a half, is now complete. It has had the approval of Mrs. Thomson and Professor Jackson and is expected to be published this spring by the Houghton Mifflin Company.

Howard L. Vickery, XIII-A, rear admiral and vice-chairman of the Maritime Commission, is chairman of the board of awards which bestows the Maritime Commission victory fleet flag, the "M" burgee given for outstanding production performance, and the accompanying merit insignia badges.



Our monthly service record statistics show a total of 12.6 per cent of the Class in uniform — 83 in the Army and 29 in the Navy. The distribution curve indicates a preponderance of colonels and is about evenly divided between commanders and lieutenant commanders. Our percentages are based on the Institute's listing of 890 members in the Class, including those who were graduated and all who were registered with 1921 for a full term.

Walter E. Church, IV, and William J. Regan, I, have been commissioned majors. Walter has been assigned to a district engineer office and Bill to the United States Military Academy. Announcement has been made that Leland H. Hewitt, I, a colonel, has been made chief of a combat engineer regiment at Camp Butner, N. C.

Your Secretaries held one of their increasingly infrequent meetings recently in New York. Ray turned up another quaint eating place, where we went Armenian and dined well on *shish kabeb*. Under the division of labors, Ray continues to handle our reunions and your Assistant Secretary is responsible for class notes. Believe it or not, our plans for faraway 1946 are under way, and you can start chalking that date on the wall now. Some of Ray's collection of news notes follow.

Lawrence Castonguay, II, announced the arrival of a new daughter, Jacqueline, who was born last Christmas time. Larry, who is busy keeping 'em flying at Pratt and Whitney in East Hartford, has a son, Pierce, who already bids fair to give the old man a run for his fly-casting laurels.

Herbert C. DeStaebler, XV, is the chief engineer and purchasing agent of the Lambert Pharmacal Company, St. Louis, where he has been located for the past eight years. In case you don't read the advertisements, Herb engineers and purchases for Listerine. His is an active family, with three youngsters of 14, 12, and 10. The eldest, a boy, is already a good aeronautical engineer in his daddy's opinion. Herb says he frequently hears about the fish business from Jack Rule, XV.

Russell H. Savage, X, is on leave from his technical directorship of the Mead Corporation and is located in Washington with the product development section of the pulp and paper branch of the War Production Board, which is under the direction of Art Wakeman, II.

Here is another reminder to send your Alumni Fund card in now and keep The Review coming to your door. Send us a note about yourself and what you hear of others, so this column will not have to resort to fiction to meet its commitments! — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLÉ A. CLARKE, *Assistant Secretary*, Federal Telephone and Radio Corporation, 1000 Passaic Avenue, East Newark, N.J.

## 1922

Our genial and efficient Secretary, Clayton D. Grover, has written to the Assistant Secretary from the West Coast about his business trip for the Whitehead Metal Products Company, but we are also informed that he is to take a well-earned

rest at Las Vegas for a week in between business conferences. He has seen Wes Hammond and F. M. Banks and hopes to get them to come to the 25th reunion.

Time of March 1 helps us keep track of our Class President, Colonel Albert J. Browning, by complimenting his solution of a difficult problem by the inauguration of "periodic pricing" for the Army to encourage reduced costs and to conserve both materials and man power.

Interesting V-mail letters from Captain William Bainbridge to Bill Mueser and Clate Grover tell of his experiences and of receiving The Review overseas. He says he has seen Major Trask.

Ken Bernard is now a lieutenant commander in the Naval Reserve. He is at the Bureau of Ships in Washington. E. L. Winslow is also in the Bureau of Ships, assigned to submarine maintenance. Ford Blanchard is a lieutenant commander in the bureau's division of plant facilities; Paul R. Stewart, of W. E. Hutton Company, 14 Wall Street, is now a lieutenant (junior grade) assigned to the salvage division; and Phillip Holmes is a lieutenant (senior grade) in the radio section. Welrose Newhall, a lieutenant (junior grade), is a mechanical superintendent at the Dravo Corporation, Wilmington, Del.

Among a group of prominent American scientists visiting Miami's sub-chaser training center was Ray C. Ellis, making an inspection of antisubmarine warfare equipment. — John Teeter is now at the Institute receiving special instructions on the work being done in the Radiation Laboratory. He will then become civilian operations analyst attached to the staff command of the Army or the Navy operating in one of the service areas.

An interesting report in a Boston paper regarding Dr. John W. Strieder relates some details of an outstanding heart operation he performed at the Boston City Hospital and credits him with a new method and most successful results.

Don't forget that a check to Horace Ford for the 1922 Scholarship Fund is a must on your list for this year. If large enough, it might make you liable for hardly any income tax at all. — CLAYTON D. GROVER, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York, N.Y. WHITWORTH FERGUSON, *Assistant Secretary*, Ferguson Electric Construction Company, 204 Oak Street, Buffalo, N.Y.

## 1923

Ray Bond's stay in England has been considerably extended. He reports that the fire-safety studies in which he is engaged have proved to be much more important than were anticipated. Much as the National Fire Protection Association would like to have him back, they have readily acquiesced to an extension of leave. You will, therefore, have to put up with notes from the Acting Secretary a little longer.

John A. Frank reports from New York City that George H. Southard was called into active duty with the Army before Pearl Harbor. A Christmas card reported he was "down under" and that as captain he was censoring the mail himself. Ap-

parently he was doing a thorough job, because he gave no further information.

Undoubtedly many of you read in *Time* of March 1 the very excellent story of "Test Pilot No. 1," Edmund T. Allen, whose death occurred on February 18. According to *Time*, he had no peer. "Most of the big ones were his babies . . .," the article read. "Greatest single tribute to his skill was that a big insurance company refused to cover such test flights unless Eddie Allen was up front. . . ." The Class regrets losing any member, but we particularly regret losing one whose contributions to aeronautical science have been so great.

Changes of address continue to pour in. Practically all of them are connected with war activities, and a majority concern men who are in the armed forces. Apparently the Class is well represented in the services. This is natural because of our training and the average age. It is also interesting to note the number of members out of the country.

Al Redway is now reported at the Geometric Tool Company in New Haven, Conn. Jack Keck reports that after several trips to New York City, he has been unable to uncover any class news. He attributes this to the activity of the classmates in the vicinity. They are working so hard that they don't have time to be found. — HOWARD F. RUSSELL, *Acting Secretary*, 71 Catlin Avenue, Rumford, R.I. HORATIO L. BOND, *Secretary*, 457 Washington Street, Braintree, Mass. JOHN M. KECK, *Assistant Secretary*, 207 Bloomfield Avenue, Bloomfield, N.J.

## 1926

Dick Whiting is now with the procurement legal division of the Navy Department, with headquarters in the Navy Building in Washington. Last month Herb Beckwith was elected to the school committee in Kingston, Mass., in a contest which Herb won easily.

It is now Captain Emerson W. Eddy of the Ordnance Department in Washington, and Major James Carey at Fort Sill, Okla. Major Ash recently called to see the Secretary, who regrets very much missing him because of being out of town.

The Secretary had the pleasure recently of dining with Harry Howard at a dinner of the Boston Society of Printers. Harry is a very active official of the Plympton Press in Norwood, Mass.

From the Boston *Herald*: "Polling 1070 votes, Dr. Marron W. Fort, M.I.T. graduate and chemist-manager of a local rum distillery, was high man in the contest for school committee and became the city's first Negro office holder." — JAMES R. KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

## 1928

To have a 15th reunion this June or not to have one — that was one of the questions discussed by the '28 delegation at the recent Alumni Dinner meeting in Boston. The vote was unanimous that we postpone this reunion until after the war. Most of the fellows expressed themselves so strongly on this point that we felt it

1928 Continued

was not necessary to poll the Class. The scarcity of gas, time, food, and train space, plus a feeling that the Class would be subject to criticism if we run a reunion in these times, were all factors that were brought out. Several classmates said that we should plan to hold an "off-year" reunion as soon as we dispose of Hitler, Tojo, and Mussolini.

Bud Reynolds is now back from Australia and is living at 684 Mineola Avenue, Akron, Ohio. Here is an excerpt from his recent letter: "I am now working for the Goodyear Aircraft Corporation, and after trying hard to change from a chemical engineer to an aircraft-production man, I seem to have lost some of my bewilderment. I had occasion in the early stages of my training to take a trip to Bridgeport to study aircraft manufacturing operations at Vought-Sikorsky. While I was there, I was introduced to some other Goodyear men who were in on a salvage school. Somebody introduced me to a John Luby. On close scrutiny, I recognized John as a classmate of mine and discovered that we had both played on the same football team. John is with Goodyear Aircraft as chief stress engineer in charge of structures in one of our plants.

"Some of the other boys whom I see occasionally are Al Gracia, who is now manager of the chemical engineering division at the Goodyear Tire and Rubber Company, and John Hartz, who is working on the development of making rubber tires without rubber. John belongs to what is commonly called the 'screw-ball' section.

"It seems good to be back in the United States again after an absence of over five years, but the pace here is terrific after the more or less leisurely life of a semi-tropical country, although undoubtedly the pace in Australia has been stepped up as a result of the imminence of Japanese invasion."

And now let's tune in on a new wave length. Charlie Richheimer is speaking from Post Office Box 4817, Jacksonville: "For the past few years I have been the partner in charge of the design and supervision of all utilities on projects handled by the engineering firms of G. A. Youngberg and Associates, and Reynolds, Smith and Hills (successors to Reynolds, Brewton, Smith and Hills). Both firms have their main offices in Jacksonville.

"We have been fortunate in being favored with Army, Navy, and Maritime Commission jobs, which have kept us all working like the proverbial beavers, but I do not believe that any period in my professional life will ever be as interesting as the past two years have been. I was lucky in avoiding the effects of the fuel oil shortage (yes, we sometimes have frosts in Jacksonville, although we do not broadcast the fact to Californians) by being in Cuba for January and February of this year, but from now on my travel will be strictly at government expense, as I have been commissioned a first lieutenant in the Sanitary Corps of the Army and will assume my new duties soon."

Lewis S. Coonley, who received his master's degree with our Class, has just

been promoted from assistant professor to the head of the department of chemical engineering and acting head of the department of chemistry at Rensselaer Polytechnic Institute in Albany.

Carlos Ferré has sent us a picture of a large cement mill in Ponce, Puerto Rico. The mill is run by the Roig and Ferré families. Connected with the plant are four M.I.T. men: J. Adalberto Roig '24, Luis Ferré '24, Carlos Ferré, and Herman Ferré '31. Carlos says the mill's production has been more than doubled to take care of Army and Navy contracts.

Bill Gorfinkle, now a lieutenant, is post chemical warfare officer at Fort Devens, according to a news release from that camp. — You'll be interested in the present rank of the following classmates, who are scattered all over the map. In the Army: Grandison Gardner, brigadier general; James Freeman, colonel; Louis Scherer, lieutenant colonel; Benjamin Hough, Jr., and Alfred Knight — majors; Vernon Brown, Albert Carey, Norman Fournier, Francis Sweeney, and Burnett Turner — captains; and James Schwartz, squadron leader. In the Navy: Anthony Davis, commander; Elmer Griep, lieutenant commander; and Richard Wilson, lieutenant.

Finally, we have the following very interesting letter from Tsu Y. Lu, writing from Room 1335, 40 Wall Street, New York: "During the period of 1929 to 1937, I was teaching in Nankin University at Tientsin, a large seaport in North China, and at the latter part of my association with the university, I was promoted to the head of the electrical engineering department. A few months before the horrible Sino-Japanese War started in 1937, a friend of mine asked me to serve in the ministry of communications. At that time we knew that the conflict between China and Japan could be avoided only by a miracle, and the situation was so tense that both sides felt nothing could be settled without using armed forces. We did not want war, but at the same time our government was forced to make necessary preparations to meet the expected military invasion. In answering such urgent calls, I had to resign my post at the university and joined the ministry, serving as the head of inspection section of the department of stores and purchase. Then in the same year war broke out, and I moved from one place to another, wherever our office happened to be evacuated.

"In the autumn of 1938, the government sent me to Hong Kong to act as the ministry's purchasing manager, and I stayed there until Hong Kong was occupied by the Japanese. I had to sneak out from that spot so that I could join the government again. Through hardships in running the blockade and much suffering on my way to our wartime capital, Chungking, I was finally lucky enough to make my formal report to our head office and to meet my family members there. Now they have transferred me to the national resources committee to serve as a technical expert. When the war is over, it will be quite a big and important job to recon-

struct China. They think it is better to send me to this country investigating the possibilities of obtaining co-operation from various American industries. I flew all the way from Chungking and arrived here in last November. I may have to stay here for the duration, and you know how I feel about leaving my family in Chungking and staying here alone. This is one reason why I am very anxious to visit places, hoping to renew my old acquaintances and to make new friends whenever there is a chance for me to do so."

Well, gang, instead of our regular 15th reunion this year, we'll just have to exchange best wishes and keep on the job. When those Axis rats are exterminated, however, we're going to have a double celebration. — GEORGE I. CHATFIELD, General Secretary, 6 Alben Street, Winchester, Mass.

## 1931

We have a promise from Henry Ahlberg for a great deal of news for next month's column. Henry is now located in Boston with the War Production Board. He spent most of the last two years traveling about the country from his headquarters in Washington. He came in contact with many of the '31 boys, and began to recite some of the details to me when we met, but in order to keep the record straight we decided a letter to the Class Secretary was in order.

The Class was represented at the Alumni Dinner by Lou Hesselschwerdt, Henry Ahlberg, and Albert Pierce. Lou is now back at the Institute teaching in the Mechanical Engineering Department. Pierce is located in New Bedford, but we lack details on his latest activities. He and Ahlberg are almost always on hand at Alumni get-togethers.

Elliot Whitaker writes the following welcome note from State College, Pa., where he has been teaching for some time: "Our family is somewhat larger than when I last saw you. We have a son, Craig, born in Boston the day that Paris fell — back in 1940; and a daughter, Susan, born here in Pennsylvania in August — between blackouts. We keep busy on the home front by having two very dependable alarm clocks, stretching our fuel oil, filling out questionnaires, and filing new ration statements. At school, with increased enrollment, accelerated semesters, and the necessity for teaching a great many women students for specific war jobs, we are keeping on our toes and endeavoring to contribute to the war effort."

The United Fruit Company has announced that Harold Champlain has been appointed division marine superintendent of its operations on the West Coast, with headquarters at 1001 Fourth Street, San Francisco, Calif.

From Huntington, N.Y., we hear that Art Newell has been recently appointed deputy director of the Office of Civilian Protection. Art is with the Kenyon Instrument Company in Huntington. Gerard E. Claussen has left Machlett Laboratories, Inc., Springdale, Conn., and has joined the staff of the Reid-Avery Company,



1931 Continued

Dundalk, Md. Norman FitzGerald has resigned from the department of petroleum economics of the Chase National Bank to become an engineering economist with the Great Lakes Carbon Corporation, New York City.

Mary Scott Tolle of Hillsboro, Ohio, was married recently to Charles W. Martel. Charlie is now a lieutenant with the Army Signal Corps and is stationed at Wright Field, Dayton, Ohio. Isabel Swansey of Sandwich, Mass., was the bride of Charles V. Dolan. Charlie and Mrs. Dolan are making their home in Wakefield. Phyllis E. Radigan of Somerville and Francis C. Crotty are another married couple. Frank, a major, is chief of the training division at the Watertown Arsenal. One of our coeds, Mary K. Cusick of Brookline, became the bride of Charles V. Donovan in March.

John King is a lieutenant with the Signal Corps at Fort Monmouth, N.J. — The following news release was received from headquarters of the Sixth Corps Area: "Major Edward H. Clouser, Quartermaster Corps, who received his B.S. degree in Mechanical Engineering from the Massachusetts Institute of Technology in 1931, has been appointed chief of the motor transport division of the Sixth Corps Area Quartermaster Office, with headquarters at Chicago. . . .

"Major Clouser, who served overseas as an aviation engineering officer during the First World War, has a wide and varied background of military training and experience. He is a graduate of the Kelly Field advanced flying school; the infantry, ordnance, and quartermaster motor transport schools. A native of Marshallton, Del., he received a B.S. degree from the University of Delaware in 1916. Major Clouser is also administrative assistant to Colonel E. C. Gere [13], Sixth Corps Area Quartermaster. . . . Their headquarters is the central point of supply and distribution for the Quartermaster Corps' work of providing food, clothing, and motor transportation for the troops of Illinois, Michigan, and Wisconsin."

Jack Wilkinson, a lieutenant, sent us a photograph of his officers' candidate school class, graduated at Miami Beach, Fla., in January. He notes that at least one M.I.T. Alumnus was among those graduating. The Washington Society of the M.I.T. sends us the information that George C. Humphreys is now a lieutenant in the Bureau of Ships, Navy Department, Washington, D.C. George was formerly engineer of the Buda Company.

Professor Charles M. Spofford has forwarded to us a copy of a letter which he received from Anant Pandya, who is now at the Bengal Engineering College, Botanic Garden Post Office, Howrah, India. Dr. Pandya writes as follows: "My work here is progressing well. I am at present extremely busy in connection with the training of technicians for war work. We all hope that with the magnificent assistance now being received from the United States, the United Nations will achieve a speedy victory, and the entire world will then enter a new era of peace, happiness, reconstruction, and prosperity. We in

India are particularly grateful for the enormous flow of American help in men and materials now being received for our defense. I only hope that in the years to come Providence will enable us to repay in full measure your unlimited and generous help in this crisis. . . ." — Be sure to look for Henry's letter in the next issue. — BENJAMIN W. STEVERMAN, *General Secretary*, 9 Graham Terrace, West Roxbury, Mass.

## 1937

Phil Dreissigacker sent me a letter from Camp Stewart, Ga., where he is stationed. Here it is for all to enjoy: "I'm writing just a few lines from Camp Stewart, where some news of Tech men is accumulating. I ran into Bob Thorson and his wife in the DeSoto Hotel lobby about two months ago. Bob is a captain with Corps of Engineers at Savannah. Tom Hallenbeck has been a proud papa for the past several months. My records of events like this are not in very good shape, so I'll have to let Tom give you the date and gender. Oz Stewart '39, a captain, spent a few months with us at Stewart. We bumped into each other one night at the officers' club, but that was our only meeting. Our battalion boasts three Technology officers: Captain John H. Colby '35, First Lieutenant Melvin W. First '36, and myself, a captain since January 23. Believe it or not, we even outnumber the Virginia Polytechnic Institute boys. Best regards and luck to all." Thanks, Phil, and let's hear more from you. Hope we hear from Tom Hallenbeck with full information on the new addition to his family.

A. V. Hazeltine, a major, was among a group of prominent American scientists who visited Miami's sub-chaser training center to make an inspection of technical equipment used by the Gulf sea frontier in anti-submarine warfare.

A clipping dated January 7 from the *Boston Post* states that the War Department had made public the names of 336 United States soldiers, including eight New Englanders, who are held as prisoners of war by the Japanese in the Philippine Islands. Among the names is that of David B. Bartlett, first lieutenant, from Belmont, Mass.

William B. Bergen, who has been working for some time on the solution of "flutter" problems at the Glenn L. Martin plant, has been successful in producing results far beyond expectations. The gadget, which detects more than flutters, is in the shape of a napkin ring and is called a "flutter detective." It is helping America make war in the air. Actually it is a stethoscope for machinery, a combination ear and eye that hears and sees what is wrong in an airplane. Our congratulations to Bergen and his associates for this very fine contribution to the air industry. Let's hope this will banish the "gremlins" for our boys.

John Gander, a captain in the Army Ordnance Reserve, and Marselia Cassidy of Old Westbury, Long Island, have announced their engagement. Joseph J. Sousa and Eleanor Ruth Tompkins of

East Orange, N.J., announced their engagement on Christmas Day. Sousa is with the Crocker-Wheeler Electric Manufacturing Company, East Orange, N.J. Annis G. Assaf and Patricia Ferry of Kenwood, Chevy Chase, Md., announced their engagement in December. At that time no date had been set for the wedding. Dr. Assaf is a member of the staff at M.I.T. — Ezriel Post, a lieutenant, and Thelma Hazel Ricles were married on November 28 in a military ceremony. They are now residing at West Palm Beach, where Lieutenant Post is stationed. George Shipley, Jr., and Florence Anne Corless were married in Houston, Texas, in December. — WINTHROP A. JOHNS, *General Secretary*, Route 1, Bellemead, N.J. PHILIP H. PETERS, *Assistant Secretary*, 10 Babson Park Avenue, Wellesley Hills, Mass.

## 1938

As a result of our fifth reunion, we're still getting news about the gang. It was certainly swell to hear from so many of the fellows.

At Camp Lee is F. E. Boland, who is a captain on the staff and faculty of the quartermaster school. He is senior instructor in subsistence. Ed Martin is also a captain. He is with an armored engineer battalion at Fort Riley. His wife and baby daughter are there with him. Barney Riddell is now a first lieutenant with the chemical warfare procurement district office in Chicago. He was married recently.

Others in the Army are A. L. Bruneau; Lieutenant Dempster Christenson at Camp Wallace, Texas; Lieutenant Walt Kaufman; Captain James Maguire, who is a battalion executive with an Army post office address; Lieutenant H. R. Oldfield, who is on the anti-aircraft artillery board at Camp Davis, N.C.; Lieutenant Frank Buffington, who is serving as a member of the coast artillery board at Fort Monroe, Va.; and Captain Fred Grosselfinger of the Signal Corps at Camp Atterbury, Ind. As for the boys in the Navy: J. A. Prichard is now a lieutenant commander; Ensign Harry Weese is doing destroyer duty; and Bob Waldinger is a lieutenant stationed in New York City.

And here's the dope from those in the Class who are in industry. Paul Tillson is in Chattanooga at the volunteer ordnance works of the Hercules Powder Company. Robert Elliott is in Wichita with the Boeing Airplane Company, and John Glacken has been at Vega Aircraft for some time and is now a service engineer on repairs. Thys Boissevain is the father of a baby boy and girl. He is working for Stone and Webster Engineering Corporation. Howard Milius is with Du Pont working on the production of commercial high explosives and has a daughter one year old. Given Brewer is also in the ranks of proud fathers with a daughter almost a year old. He is doing development engineering at the Ford factory in Willow Run. S. G. Glick is working with General Electric in Schenectady.

C. C. Lawrence is a special maintenance engineer for Proctor and Gamble at their

1938 Continued

Baltimore plant. H. N. Homeyer is doing research work for Bauer and Black in Chicago. From John Baker we learn that he's in Indianapolis "trying to meet and better delivery schedules for war materials for Army Engineers, the Navy, the Maritime Commission, and lend-lease." That is a mighty big order to fill. Vincent Salmon is a physicist for the Jensen Radio Manufacturing Company in Chicago. He has two daughters.

Earle Pulsifer is assistant estimator at the Bath Iron Works in Maine; Carl Olson is a test engineer at the Fore River yard of Bethlehem Steel; and Rodolfo Herrera is at the Massachusetts General Hospital as the house officer on the surgical service. He was graduated from Harvard Medical School last June.

A coed of our Class, Mrs. William J. McCullough (Ruth G. Raftery), tells us she's really taking advantage of her Technology background — using her chemical engineering training to prepare formulas for her two young sons. Her husband is an engineer with the Merchant Marine.

Gifford Griffin, who's a captain in the Ordnance Department, is stationed at the Aberdeen Proving Ground. His work is with the facilities section of the automotive (combat vehicles) branch of the proving center. He adds that there are a great many M.I.T. men at Aberdeen. He ushered at Tony Smith's wedding to Dell Williams in Richmond recently.

We'll end our notes for this time with an announcement of the single engagement we've heard about — Dorothy L. Nagle of Houston, Texas, to Robert H. Park. She is a graduate of the University of Texas. Lieutenant Park is now stationed at Camp Claiborne, La., with a petroleum outfit. — DALE F. MORGAN, *General Secretary*, 6 Avon Road, New Rochelle, N.Y. RICHARD MUTHER, *Assistant Secretary*, Room 1-180, M.I.T., Cambridge, Mass.

1940

Edith Kingsbury reports that "Mr. and Mrs. Joseph McGinniss are the proud possessors of a son, Joseph, Jr., born on December 9. Edward Chin-Park is working hard for the war effort, doing site planning and working on an airfield layout and troop housing. Helen Bunker Ross is back in architecture again working for Ross and MacDonald. James Boulger, Jr., an ensign, is having the time of his life in Coral Gables, Fla., where he is taking aerial navigation under the Pan American Airways and flying all over Florida."

Bill Kather tells me that he became the proud father of an eight-pound baby girl, Joan Carol, on October 29, and the following week he transferred to the Air Corps, where he is now a cadet holding the rank of second lieutenant in flight training. Bill also speaks of Phelps Walker, who is attending officers' candidate school in the Coast Guard, where he received his commission in February. Tom Creamer also saw Phelps when he was going through Boston after completing his course.

Al Guttag and Russ Werby attended the Alumni Dinner in Boston. Al, who is

now working for the Patent Department in Richmond, Va., told of seeing or hearing from Fred Magnusson, who is in the chemical section of the Board of Economic Warfare, and of Al Green, who is working for the Naugatuck Chemical Company. He also reported that Arni Arch had recently been promoted to the rank of captain in the Army.

Tom Creamer sent along a letter he received from Harold Miller, which gave the following information: "Just dropping a line to let you know that another of the Class has gone to war. I finally got bored with inspecting Signal Corps communications equipment for the War Department and decided to use the stuff myself for a change. So I accepted a commission in the Signal Corps early in December, 1942. I'll probably be getting into electronics work shortly. I've seen no one else from our Class. Regards to the boys." — Harold is now a second lieutenant at Fort Monmouth, N.J.

Lizzie Lish also dropped Tom a line from Edgewood Arsenal. He wrote the following news: "We are now the technical command of the Chemical Warfare Service instead of the technical division. I've read in *The Review* that many of the boys of '40 have passed through Edgewood Arsenal. I haven't seen any of them except Russ Werby, who is a captain here in the safety division. I work in the same outfit, plants designing, as Paul Schneider '39, a lieutenant; Gordon L. Foote '38, a captain; and Louis Sherman '38, a lieutenant. We have a good Technology representation in our division and also among the other divisions here at the arsenal. Jean Lewis, when I last heard of him, was working in the production division.

"Nothing exciting has really happened to me. As far as marriage is concerned, I'm still among those eligible. I guess I forgot to mention that I'm here as one of those 'civilian experts' we read so much about."

This is all the news for the present, and I wish to thank those who have sent it in. I hope others will send us news for the next issue. — H. GARRETT WRIGHT, *General Secretary*, 1124 Greenwich Street, San Francisco, Calif. THOMAS F. CREAMER, *Assistant Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

1941

We finally ran out of formal letters, and so we were reduced to reading newspapers for items of interest to '41 men. Suddenly the idea dawned on us to start looking up the old "hold" basket which seems to clutter up this desk of ours. No wonder we haven't received any mail of late; we haven't written any. Our last bit of correspondence in most cases was a Christmas card, and Christmas was a long time ago. We are starting to answer said cards tonight, despite our 18-hour-a-day work schedule. (The old man says it should be 24 hours, and I must admit we waste 6 hours sleeping.)

Greeting for the holidays came from Charlotte and Norman, who is now captain Shapira. "The season's very best, Stan," was sent by the Alumni Fund and

from Chick Kane '24. — "Remembering you at Christmas and wishing you all the good things for the New Year," wrote Charlotte and Will Mott. "We haven't heard from you in quite a while. How's about it, and where are you?" The card was from St. Louis. No wonder no letter; this is the first time we've noted the back of the card.

We put a note on our calendar reminding us that we ran into Captain Arthur Fuller '26, with whom we have been working for the past few months. The subject of the Institute was brought up by the presence of a copy of *The Review* on my desk.

"Hello there, Merry Christmas," was the greeting from the ordnanceman Herb Moody. I hardly know whether he is now a captain or a colonel. I lost the outside of Herb's card and so have no address. A weak excuse indeed! Wonder if he meant what the card said about "happy wishes your kind of friendship brings"? A warm card with a note was sent by Paul and Betsy Erlandson with the question, "What's happening at your end?"

Got a hot release from the Boston Ordnance Department about a certain Captain E. A. Beaupre, chief of the fuze and booster (yes we said "fyooze" and "booosta," whatever they mean) section of the Boston Ordnance District, who did a swell job in the running of the S. A. Woods Company when the government took over a while back. Mention was also made of Ed's tennis, hockey, and throwing abilities.

Digging in the files we came across a very interesting letter written last year. I know it has been mentioned before, but it is no doubt still of interest to those who may have missed an issue. It is from Mal Dodd, who wrote as follows: "I got a V-letter the other day from Jack Kriz. [This news is old enough to be quite harmless. *Sec.*] Jack started out with Standard Oil in the foreign service in South China and in the Dutch East Indies, but the war caught up with him and he wound up in the United States Army in Australia. He served six months of staff duty and was constantly trying to get in the field up until the time he was injured. He wrote the letter from a hospital and states that his transfer had come through during that time. A lot of the boys in Course XVI will remember Bud Fletcher. Jack ran into him in Australia. He is now a captain in the Air Corps. I have received only one letter from Guy Slaughter, a Navy lieutenant. He has been at Pearl Harbor since graduation and managed to live through December 7. In my brief three weeks at Wright Field, I found that most of Course XVI of the Class of '41 was there. They will have to send in their own information." Now if this news is too old for Walkowicz, Nelson, England, Crane, Lowell, Abzug, or Adelson, let's have some more recent stuff. — STANLEY BACKER, *General Secretary*, 46 Bicknell Street, Dorchester, Mass. JOHAN M. ANDERSEN, *Assistant Secretary*, Room 12-184, M.I.T., Cambridge, Mass.



1942

After several months of rather inactive existence, your Cambridge correspondent is once again batting out the dirt; and dirt it is, so let's start digging. The first juicy morsel comes from the press agent of one Felix DeLeo, who has something to do with the Army on the West Coast. Among Wolf's many accomplishments, writes the agent, may be listed that of having had a date with Betty Grable. The literature covering this momentous event is far and away too voluminous to be repeated in its entirety, and therefore we are forced to edit and otherwise delete certain sections therefrom. The gist of the matter is that our Felix committed the following sins with the aforementioned Miss Grable of the Hollywood Grables: ate with her, danced cheek to cheek with her, jitterbugged with her, drank with her (the number of straws is not mentioned), and slept at her house. Mention of all of this has appeared in at least one of the many Hollywood publications and also in *The Tech*. The agent goes on to state that Mr. DeLeo has just been voted champion wolf of the armed forces of the United States. Wolf also claims that, should anyone so desire, he can fix him up — no doubt.

After many moons of social inactivity, Hawk Shaw once again has come through as a source of news. The humorous one was seen at the Chi Phi house recently at their annual Bohemian brawl. Hawk was dressed in a very becoming nightshirt, the flannel variety. The unusual part of the garb was the presence of sandals on the lovely feet of Mr. S. Evidently the Shavian social graces have taken a turn for the worse, or possibly it is still too early in the year for beach parties. Hawk is still hard at work at Harvard Medical School.

Still another of the black sheeps has come through with a few items of interest. We speak of Sleazy Van Nostrand, one of Uncle Sam's ensigns. While on an inspection trip of one of New York's many bars, he ran across Captain Monroe Brown, the first member of '42 we know has reached that rank. Brown is in the Air Corps and is stationed in Washington, where he has the only office as yet not moved to the undesirable Pentagon Building. Captain Brown has been in an airplane twice in his life, once with General Doolittle and once with Lieutenant Colonel Cook, both Technology Alumni. Rumor has it that both times he was in the air, Monroe sat on the escape hatch with his parachute rip cord in one hand and the hatch dog in the other.

Less spectacular has been the life of the boys in the Navy uniforms. Hank Henderson rests all day in the Bureau of Aeronautics and works all night in Virginia, where he has hidden himself and his attractive wife. Maury Taylor can be found almost any day at the Bureau of Ships, unless he is in some bar with Carl Jealous. Carl is using his publications experience by writing secret documents for the government as a Navy civilian employee at the Washington Navy Yard.

Word has come from under tropical skies that Gene Brady and Joe Welch are bunking together in some sort of an apartment with maid service near some airport that they are practically in charge of. As soon as Washington can find them, they expect to be made generals or something. Carl Zeitz is somewhat in charge of a small airport in Kansas City with WAACs working under him. Fred Dierks is also in the same city working for North American Aviation. Frank Seeley now finds himself in the enviable position of not only having a wife but also of being one of ten Navy men stationed among a multitude of Army officers at Wright Field, where he is inspecting just about everything in general.

Hopping across the ocean for a brief while, we learn that Bob Ely and Jack Madwed are learning Chicago German from those of Rommel's troops who are not fortunate enough to be track stars. Bob Ely is in the Field Artillery, flying a plane. This occupation is not to be confused with that of certain Air Corps men who shoot guns. Jack Madwed is driving some sort of a vehicle that makes more noise than one of Jack Finger's Model A's. By the way, Jack Finger is in the Navy, having completed his indoctrination at Dartmouth quite some time ago.

Odd bits from odd places: Joe Boltinghouse just missed getting drafted and is with Sperry Gyroscope in Brooklyn; Jim McClelland is still trying to persuade Chrysler engineers to put rear-vision mirrors on their tanks; Owen Welles, Frank McClintock, and a few others are still working for their master's degrees at Technology; Dick Seidman is working for the Polaroid Corporation in Cambridge and has three girls working under him; Lou Rosenblum is hanging his hat at the same palace of toil; Al Root is shirking for Remington Arms in Ilion, N.Y., on a nine-day-a-week basis; and Jay Brandon is with Western Electric.

Dick Hartley received his commission as an ensign right after graduation and then proceeded to flunk the physical examination. Some time later he met a girl. Then he took the exam again and passed. Part way through training school he began to feel the urge and took (obtained) a 24-hour leave and proceeded to get married. The girl in this little tale of modern romance is Dorothea Heckman of Wilkesburg, Pa.

Word has just come to the effect that Bob Secord, erstwhile embryo chemist, has been on some island in the southwest Pacific since last August.

In February, the Department of Chemical Engineering recommended six or seven men for master's degrees and then dumped them out into the noble profession. Russ Thompson, one of the dumptees, is teaching at the University of Texas. Dave Christison is amazing petroleum experts and several Brooklyn bartenders, combining work with pleasure at the Socony-Vacuum Oil Company in Brooklyn. Incidentally, Bull has taken to culture like Stempf to lust. Now he attends the opera, concerts, visits art exhibitions, and holds his stein with only

one fist. Jack Loveland has taken the Standard Oil Company of New Jersey under his guidance, and no more trouble should spring from that concern. Heine Shaw, the stress-analysis kid, tells about meeting Benjamin L. Skinner, Esq., and valet Harry Blakeslee at some ski joint.

We should greatly appreciate it if you would send along a résumé of some of your more important activities. And while you are about it, let's have more than just the address. Incidentally, who is going to become the first father from the Class? — FREDERICK W. BAUMANN, JR., *General Secretary*, Orchard Lane, Golf, Ill. KARL E. WENK, JR., *Assistant Secretary*, The Graduate House, M.I.T., Cambridge, Mass.

1943

The mailbag was small this month, which is not too surprising, because as yet my address has not been made known to the entire Class. So when you see any of the lads, let them know when and how to get news to me for publication in this column.

Virgil Otto writes: "George Musgrave and I are out in Indianapolis working at an ordnance plant. The work involves production problems, and there are plenty. Incidentally, we are in a civilian capacity. Barrett Russell is in New Jersey with Standard Oil."

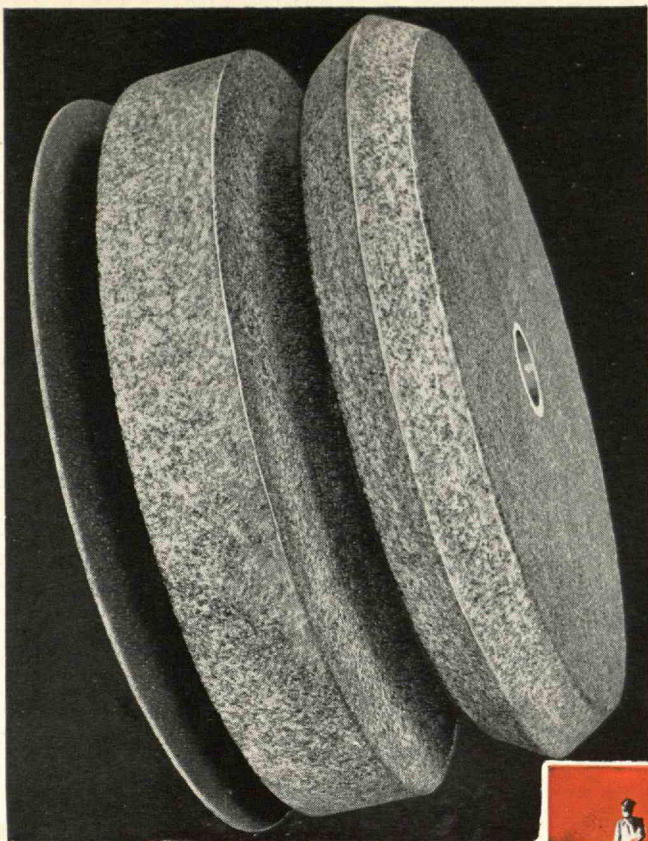
We hear that Ensign Morton Spears is to wed Dorothy Hess of Waterbury, Conn., shortly. Mort is stationed at Fort Schuyler in New York. Jack Reese, who is at Camp Belvoir in Virginia, will be married in the near future to Helen Battis of North Quincy, Mass. The last item in the matrimony list for the month is that Charlie Coles and Ethel Febiger of Boston will be married before long.

It is certainly of interest to you all to know where the various members of the Class are now settled, and it will be my intention to get that information into this column as soon as possible. The preparation of such information however, is not simple, because getting word of the whereabouts of the lads is a slow process. So let me know where the fellows you know about are, and don't forget to tell me what you are doing.

From Frank French, who is now at the Institute finishing up after his trip to the three stations of the School of Chemical Engineering Practice, I hear that Henry Walcott is at Fort Monmouth with the Signal Corps. Says Henry: "It's a tough life."

The Institute claims the services of many of the Class, and Art Vershbow tells me that Warren Manger, Bill Green, and Frank Dibble are with him in the Radiation Laboratory in Cambridge. Finally, the Honors Group in Mechanical Engineering is keeping Bernard Anderson, Lewis Lipschutz, Ken Wadleigh, and Cy Kano mighty busy. Ken says that by burning a little more of the midnight oil than usual, they will be able to get their master's degrees before the Army calls them this June. — CLINTON C. KEMP, *General Secretary*, The Graduate House, M.I.T., Cambridge, Mass.

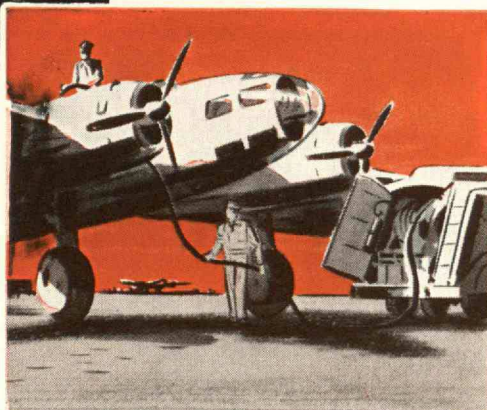
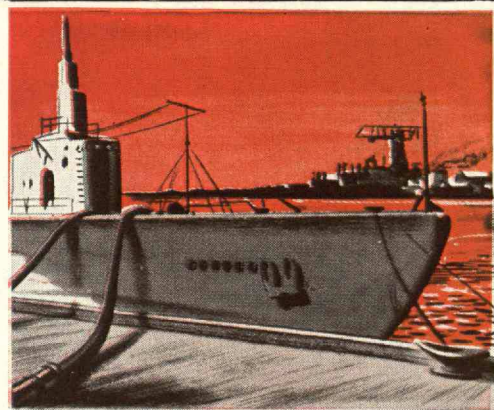




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